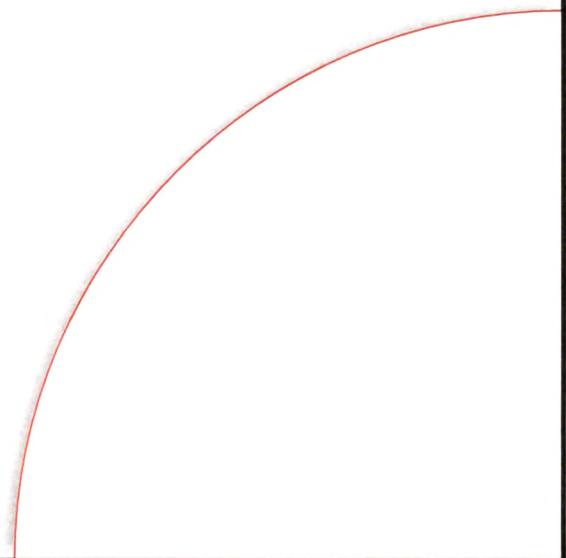




References



R e f e r e n c e s

- ◆ Abou-Nemeh, I., and A. P. VanPeteghem, "Some Aspects of Emulsion Instability on Using Sorbitan Monooleate (Span 80) as a Surfactant in Liquid Emulsion Membranes," *Chem. Ing. Tech.*, **62**, 420 (1990).
- ◆ Abou-Nemeh, I., and A. P. VanPeteghem, "Sorbitan monooleate (Span 80) Decomposition during Membrane Ageing. A Kinetic Study," *J. Membr. Sci.*, **74**, 9 (1992).
- ◆ Abou-Nemeh, I., and A. P. VanPeteghem, "Kinetic Study of the Emulsion Breakage during Metals Extraction by Liquid Surfactant Membranes (LSM) from Simulated and Industrial Effluents," *J. Membr. Sci.*, **70**, 65 (1992).
- ◆ Abou-Nemeh, I., and A. P. VanPeteghem, "Membrane Recycling in the Liquid Surfactant Membrane Process," *Ind. Eng. Chem. Res.*, **32**, 1431 (1993).
- ◆ Asher,W.J., K.L.Bover, C.T.Vogler, R.W.Hamilton, and P.G.Holtzapple, "Secretion Modified Release of Urease from Liquid Membrane Capsules," in *Membrane Handbook*, Eds. Ho, W.S., and K.K. Sirkar, Chapman and Hall, NewYork, (1992).
- ◆ Banerjea, S., S. Datta, and S. K. Sanyal, "Mass Transfer Analysis of the Extraction of Cr(VI) by Liquid Surfactant Membrane," *Sep. Sci. Technol.* , **35**, 483 (2000).
- ◆ Bart, H. J., C. Ramaseder, T. Haselgrubler, R. Marr, "The Investigation of Osmosis in the Liquid Membrane Technique Influence of Key Parameters," *Hydrometallurgy*, **28**, 253 (1992).
- ◆ Bart, H. J., H. Jungling, N. Ramaseder, and R. Marr, "Water and Solute Solubilization and Transport in Emulsion Liquid Membranes," *J. Membr. Sci.*, **102**, 103 (1995).
- ◆ Becher, P., "Encyclopedia of Emulsion Technology," Vol 1, Marcell Dekker, New York, (1983)
- ◆ Bhowal, A., S. Dutta, "Studies on Transport Mechanisms of Cr(VI) Extraction from an Acidic Solution Using Liquid Surfactant Membranes," *J. Membr. Sci.*, **188**, 1 (2001).
- ◆ Bock,J., and P.L.Valint "Uranium Extraction from Wet Process Phosphoric Acid : A Liquid Membrane Approach," *Ind. Eng. Chem. Fundam.*, **21**, 417 (1982)
- ◆ Borwankar, R. P., C. C. Chan, D. T. Wasan, R. M. Kurzeja, Z. M. Gu, and N. N. Li, "Analysis of Effect of Internal phase Leakage on Liquid Membrane Separations," *AICHE J.*, **34**, 753 (1988)

- ◆ Boyadzhiev, L., T.Sapundzhiev, and E. Bzenshek, "Modeling of Carrier Mediated Extraction," *Sep. Sci.*, **12**, 541 (1978)
- ◆ Boyadzhiev, L., E. Bzenshek, " Carrier Mediated Extraction: application of Emulsion Technique for Mercury Removal from Wastewater," *J. Membr. Sci.* , **14**, 13 (1983).
- ◆ Boyadzhiev, L., E. Bzenshek, and Z. Lazarova, "Removal of Phenol from Waste Water by Double Emulsion Membranes and Creeping Film Pertraction, *J. Membr. Sci.* , **21**, 137 (1984).
- ◆ Brown, P.R., R.M.Izatt, J.J.Christensen, J.D.Lamb, " Transport of Eu(II) in H₂O-CHCl₃-H₂O Liquid Membrane System Containing the Macrocyclic Polyether 18-Crown-6," *J.Membr.Sci.*, **13**, 85 (1983)
- ◆ Bunge, A.L., and R.D. Noble " A Diffusion model for Reversible Consumption in Emulsion Liquid Membranes," *J.Membr.Sci.*, **12**, 541 (1984).
- ◆ Cahn, R. P., and N.N. Li, "Separation of Phenol from Waste Water by the Liquid Membrane Technique." *Sep. Sci.*, **9**, 505 (1974).
- ◆ Cahn, R. P., N. N. Li, and R.M. Minday, "Removal of Ammonium Sulfide from Industrial Sour Water by Liquid Membrane Process," *Environmental Sci. Technol.*, **12**, 1051(1978)
- ◆ Carter, B. P., and H. Freiser, "Kinetics and Mechanism of Extraction of Copper with 2-Hydroxy-5 nonylbenzophenone oxime," *Anal. Chem.*, **52**, 511 (1980).
- ◆ Chakraborty, M., C. Bhattacharya, and S. Datta, "Effect of Drop Size Distribution on Mass Transfer Analysis of the Extraction of Nickel (II) by Emulsion Liquid Membrane," *Coll. and Surf.*, **224**, 65 (2003).
- ◆ Chakravarti, A. K., S. B. Chowdhury, S. Chakrabarty, T. Chakrabarty, and D. C. Mukherjee, " Liquid Membrane Multiple Emulsion Process of Chromium (IV) Separation from Waste Waters," *Coll. and Surf.*, **103**, 59 (1995).
- ◆ Chakravarti, A. K., S. B. Chowdhury, and D. C. Mukherjee, "Liquid Membrane Multiple Emulsion Process of Separation of Copper (II) from Wastewaters," *Coll. and Surf.*, **166**, 7 (2000).
- ◆ Chang, Y. C., and S. P. Li, "A Study of Emulsified Liquid Membrane Treatment of Phenolic Waste Water," *Desalination*, **47**, 351 (1983).
- ◆ Chaudhuri, J.B., and D.L.Pyle, "Emulsion Liquid Membrane Extractions of Organic Acid: 1 A Theoretical Model for Lactic acid with Emulsion Swelling," *Chem. Eng. Sci.*, **47**, 41 (1992)

- ◆ Christensen, J. J., S. P. Christensen, M. P. Bheil, S. A., Lowe, J. D. Lamb, R. M. Izatt, "Effect of Receiving Phase Anion on Macrocycle Mediated Cation Transport Rates and Selectivities in Water – Toluene- Water Emulsion Membranes," *Sep. Sci. Technol.*, **18**, 363 (1983).
- ◆ Colinart, P., S. Delepine, G. Trouve, and H. Renon, "Waster Transfer in Emulsion Liquid Membrane Process," *J. Membr. Sci.*, **20**, 167 (1984).
- ◆ Cox, M., and D. S. Flett, "Metal Extractant Chemistry," in *Handbook of Solvent Extraction*, Eds. Lo. T. C., M. H. I. Baird, and C. Hanson, Wiley- Interscience, New York , pp 53-90 (1983).
- ◆ Crank, J., *The Mathematics of Diffusion*, 2nd ed., Chap 12, Clarendon Press, Oxford(1975).
- ◆ Cussler, E. L., and D.F. Evans, "Liquid Membranes for Separations and Reactions," *J.Membr.Sci.*, **6**, 113, (1980).
- ◆ Ding, X. C., and F.Q. Xie, "Study of the Swelling Phenomena of Liquid Surfactant Membranes," *J. Membr. Sci.*, **59**, 183 (1991).
- ◆ Downs, H. H., and N. N. Li, " Extraction of Ammonia from Wastewater by the Liquid Membrane Process," *J. Sep. Process Technol.*, **2**, 19 (1981).
- ◆ Draxler, J., and R. J. Marr, "Emulsion Liquid Membranes: Part I. Phenomenon and Industrial Application," *Chem. Eng. Process.*, **20**, 329 (1986).
- ◆ Draxler, J., W. Furst and R. Marr, "Separation of Metal Species by Emulsion Liquid Membranes," *J. Membr. Sci.*, **38**, 281 (1988).
- ◆ El. Reffy, S. A., Y. T.Selim, H. F. Aly, "Kinetic Studies on the Separation of Uranium and Thorium from Nitric Acid Medium By Liquid Emulsion Membrane based on TOPO Extractant," *Anal.Sci.*, **13**, 333 (1997).
- ◆ El. Reffy, S. A., Y. T.Selim and H. F. Aly, "Recovery of Uranium from Thorium in Hydrochloric Acid Medium by Liquid Emulsion Membrane Containing TOPO," *J. Radioanal. Nucl. Chem.*, **228**, 21(1998).
- ◆ El- Said,N., El- Sheref and E. Borai, "Modeling and transport of Cs(137) by Emulsion Liquid Membrane (18 C 6) in Xylene Promoted by Ephedrine Hydrochloride in Stripping Phase," *J. Membr Sci.*, **211**, 183 (2003)
- ◆ Eroglu, I., R. Kalpakci, and G. Gunduz, "Extraction of Strontium ions with Emulsion Liquid Membrane Technique," *J. Membr. Sci.*, **80**, 319 (1993).

- ◆ Feng, Z. L., X. D. Wang, and X. J. Zhang, "A New High Voltage Electrostatic Coalescer EC-1 applied to Liquid Membrane Separation," *Water Treatment*, **3**, 320 (1988).
- ◆ Fischer, J.F.C and C.W. Notebaart, "Commercial Processes for Copper" in *Handbook of Solvent Extraction*, Eds. Lo. T. C., M. H. I. Baird, and C. Hanson, Wiley-Interscience, New York , pp 649-671 (1983).
- ◆ Flett, D.S., D.N. Okuhara, and D.I. Spunk, "Solvent Extraction of Copper by Hydroxy oximes," *J. Inorg. Nucl. Chem.*, **35**, 2471, (1973)
- ◆ Frankenfeld, J. W., and N. N. Li, "Waste Water Treatment by Liquid Ion Exchange in Liquid membrane System" *Recent Developments in Separation Science*, ed. N. N. Li, **Vol. 3**, pp 285-292, Boca Raton, FL: CRC Press.(1977)
- ◆ Frankenfeld, J. W., and N. N. Li, "Extraction of Copper by Liquid Membranes," *Sep. Sci. Technol.*, **16**, 385 (1981)
- ◆ Fudu, M., X. Li, and Y. Zhang, " The Mathematical Modeling of the Removal of Phenol with Emulsified Liquid Membranes," *Desalination*, **56**, 355 (1985).
- ◆ Gadekar, P. T., A. V. Mokkolatti, and K. K. Tiwari, "Recovery of Nitrophenols from Aqueous Solutions by a Liquid Emulsion Membrane System," *Sep. Sci. Technol.*, **27**, 427 (1992).
- ◆ Gallego-Lizon, T., E. S. Perez deOrtiz, "Drop Sizes in Liquid Membrane Dispersions," *Ind. Eng. Chem. Res.*, **39**, 5020 (2000).
- ◆ Gleason, K.J., J.Yu, A . Bunge, J.D.Wright, "Removal of Selenium from Contaminated Waters using ELMs," in *Chemical Separations with Liquid Membranes* Eds. Bartsch, R and J.D. Way, ACS symposium series, 642, pp.342 – 360, (1996)
- ◆ Goto, M., T. Kakoi, N. Yoshii, K. Kondo, and F. Nakashio, "Development of New Surfactant for Liquid Surfactant Membrane Process," *J. Chem. Eng. Japan*, **20**, 157 (1987).
- ◆ Goto, M., T. Kakoi, N. Yoshii, K. Kondo, and F. Nakashio, "Effect of New Surfactants on Zinc Extraction with Liquid Surfactant Membranes," *J. Membr. Sci.*, **57**, 161 (1991).
- ◆ Goto, M., T. Kakoi, N. Yoshii, K. Kondo, and F. Nakashio, "Effect of Synthesized Surfactant in the Separation of Rare Earth Metals by Liquid Surfactant Membranes," *Ind. Eng. Chem. Res.*, **32**, 1681 (1993).

- ◆ Gu, Z. M., D. T. Wasan, and N. N. Li., "Interfacial Mass Transfer in Ligand Accelerated Metal Extraction by Liquid Surfactant Membranes," *Sep. Sci. Technol.*, **20**, 599 (1985).
- ◆ Gu, Z. M., W. S. W. Ho, and N. N. Li., " Design considerations," in Membrane Handbook, Eds. Ho, W. S., K. K. Sirkar, Chapman & Hall: NY, pp 656-700. (1992)
- ◆ Halwachs, W., and K. Schugerl, "The Liquid Membrane Technique-A Promising Extraction Process," *Chem. Ind. Tech.*, **50**, 767 (1978).
- ◆ Hano, T., T. Ohtake, M.Matsumoto, S. Ogawa and F. Hori, "Extraction of Penicillin with Liquid Surfactant Membranes," *J.Chem. Eng.Japan* **23**, 772, (1990)
- ◆ Hano, T., T. Ohtake, M.Matsumoto, S. Ogawa and F. Hori, "Application of a Liquid Surfactant Membrane for recovery of Penicillin G," *J. Membr. Sci.*, **84**, 271 (1993).
- ◆ Harada, M., and Y.Miyake, "Solvent Extraction with Chelating Agents," in Handbook of Heat and Mass Transfer Vol 3, Ed. N.P. Cheremisinoff, Gulf Publishing Co. pp 789 – 882 (1989)
- ◆ Hayworth, H. C., W. S. Ho, W. A. Burns Jr., and N. N. Li., "Extraction of Uranium from Wet Process Phosphoric Acid by Liquid Membranes," *Sep. Sci. Technol.*, **18**, 493 (1983).
- ◆ Hiemenz, P.C., and R.Rajagopalan, "Principles of Colloid and Surface Chemistry," 3rd Ed., Marcell-Dekker, New York (1997)
- ◆ Hirato, T., I.Kishigami, Y. Awakura, and H.Majima, " Concentrating Uranyl Sulfate Solution by an Emulsion Type Liquid Membrane Process," *Hydrometallurgy*, **26**, 19 (1991)
- ◆ Ho, W. S., T. A. Hatton, E. N. Lightfoot, and N. N. Li, "Batch Extraction with Liquid Surfactant Membranes" A Diffusion-Controlled Model," *AIChE J.*, **28**, 662 (1982).
- ◆ Ho,W.S., and N.N.Li "Modeling of Liquid Membrane Extraction Process" in Hydrometallurgical process Fundamentals, Ed. R.G. Batisuta, Plenum press NewYork (1984)
- ◆ Ho, W.S., and N.N. Li in Membrane Handbook Eds. Ho, W.S., and Sirkar K.K., Chapman and Hall, NewYork (1992)
- ◆ Hochhauser, A.M., and E.L.Cussler, "Concentrating Chromium with Liquid Surfactant Membrane," *AIChE Symp.Ser.*, **71**, 36, 1975.
- ◆ Horvath, A.L., Handbook of Aqueous Electrolyte Solutions, Ellis-Horwood, NewYork (1985)

- ◆ Hsu, E. C., and N. N. Li., "Membrane Recovery in Liquid Membrane Separation Process," *Sep. Sci. Technol.*, **20**, 115 (1985).
- ◆ Huang, C.R., K.C.Wang, and D.W.Zhou, "Mathematical Modeling of Carrier-Facilitated Transport in Emulsion Liquid Membranes," in Chemical Separations with Liquid Membranes Eds. Bartsch, R and J.D. Way, ACS symposium series, 642, pp.115 – 128, (1996)
- ◆ Hummelstedt, L., E.Paatero, T.Nyberg, and L.Rosenback, "Investigation of the Catalytic Mechanism in the Extraction of Copper with Mixtures of the Pure Active Hydroxyoxime Isomers of LIX 64 N," Proceedings of I S E C 80, 80, (1980)
- ◆ Itoh, H., M. P. Thien, T. A. Hatton, and D. I. C. Wang, "Water Transport Mechanism in Liquid Emulsion Membrane Process for the Separation of Amino Acids," *J. Membr. Sci.*, **51**, 309 (1990).
- ◆ Izatt, R.M., G.A.Clark, J.B. Bradshaw, J.D. Lamb and J.J.Christensen, "Macrocycle Facilitated Transport of Ions in Liquid Membrane Systems," *Sep.Purf.Methods*, **15**, 21 (1986)
- ◆ Izatt, R.M., R.L. Bruening, W.Geng, M.H.Cho, and J.J.Christensen, " Separation of Bivalent Cadmium, Mercury and Zinc in a Neutral Macrocyclic Mediated Emulsion Liquid Membrane System," *Analy. Chem.* ,**59**, 2405, (1987)
- ◆ Jefferson, T.B., O.W.Witzell, and W.L.Sibbitt, "Thermal Conductivity of Graphite Silicone-oil and Graphite Water Suspensions," *Ind. Eng.Chem.*, **50**, 1589, (1958)
- ◆ Juang, R. S., and J. D. Jiang, " Recovery of Nickel from a Simulated Electroplating Rinse Solution by Solvent Extraction and Liquid Surfactant Membrane," *J. Membr. Sci.*, **100**, 163 (1995).
- ◆ Kakoi, T., M. Goto, S. Natsukawa, K. Ikemizu, F. Nakashio, M. Matsumoto, and T. Hano, " Recovery of Phenols Using Liquid Surfactant Membranes Prepared with Newly Synthesized Surfactants," *Sep.Sci.Technol.* **31**, 107 (1996).
- ◆ Kakoi, T., N.Harvouchi, M. Goto, F. Nakashio, " Selective Recovery of Palladium from a Simulated Industrial Waste Water by Liquid Surfactant Membrane Process," *J.Membr.Sci.*, **118**, 63 (1996)
- ◆ Kakoi, T., T.Nishiyori , T.Oshima, F.Kubota, M. Goto, S.Shinkai and F. Nakashio, "Extraction of rare earth metals by liquid surfactant Membranes containing a Novel Cyclic Carrier" *J.Membr.Sci.*, **136**, 261, (1997)

- ◆ Kargari, A., T. Kaghazchi, M. Sohrabi, M. Soleimani, "Batch Extraction of Gold (III) ions from Aqueous Solutions Using Emulsion Liquid Membrane Via Facilitated Carrier Transport," *J. Membr. Sci.*, **233**, 1 (2004).
- ◆ Kasani, H., F. Nakashio, M. Goto, "Application of Emulsion Liquid Membrane to Recovery Cobalt Ions from a Dual-Component Sulfate Solution Containing Nickel ions," *J. Membr. Sci.*, **146**, 159 (1998).
- ◆ Kataoka, T., T. Nishiki, and S. Kimura, "Phenol Permeation through Liquid Surfactant Membranes-Permeation Moel and Effective Diffusivity," *J. Membr. Sci.*, **41**, 97 (1989).
- ◆ Kataoka, T., T. Nishiki, K. Osaki, and A. Muto, "A Practicable Process for Phenol Removal with Liquid Surfactant Membrane Permeation Column," *Sep. Sci. Technol.*, **32(8)**, 1447 (1997).
- ◆ Kim, K. S., S.J.Choi, and S. K. Ihm, "Simulation of Phenol Removal from Wastewater by Liquid Membrane Emulsion," *Ind.Eng.Chem.* **22**, 167 (1983).
- ◆ Kinugasa, T., K. Watanabe, T. Utenomiya, and H. Takeuchi, "Modeling and Simulation of Counterflow W/O emulsion Spray Column for Removal of Phenol from Dilute Solutions" *J. Membr. Sci.*, **102**, 177 (1995).
- ◆ Kitagawa, T., Y. Nishikawa, J. W. Frankenfeld, and N. N. Li, "Wastewater Treatment by Liquid Membrane Process," *Environ. Sci. Technol.*, **11**, 602 (1977).
- ◆ Kopp A.G., R.J.Marr and F.E. Moser, "A New Concept for Mass Transfer in Liquid Surfactant Membranes Without Carriers and With Carriers that Pump," *Inst. Chem. Eng., Symp.Ser.*, **54**, 279 (1978)
- ◆ Kremesec,V.J., "Modeling of Dispersed Emulsion Separation System," *Sep.Purif. Methods*, **10**, 117 (1981)
- ◆ Kremesec,V.J., and J.C.Slattery, " Analysis of Batch Dispersed Emulsion Separation Systems," *AIChE.J.*, **28**, 492 (1982)
- ◆ Kulkarni, P. S., K. K. Tiwari, and V. V. Mahajani, "Recovery of Nickel via Liquid Emulsion Membrane Process Using Methance Sulfonic Acid as a Strippant," *Sep. Sci. Technol.*, **36**, 639 (2001).
- ◆ Kulkarni, P. S., S. Mukhopadhyay, M. P. Bellary, and S. K. Ghosh, "Studies on Membrane Stability and Recovery of Uranium (VI) from Aqueous Solutions Using a Liquid Membrane Extraction Process," *Hydromettalurgy*, **64**, 49 (2002).

- ◆ Kulkarni, P. S., and V. V. Mahajani, "Application of Liquid Emulsion Membrane (LEM) process for enrichment of Molybdenum from Aqueous Solutions," *J. Membr. Sci.*, **201**, 123 (2002).
- ◆ Kumaresan, T., K. M. Meerasheriffa Begum, P. Sivashanmugam, N. Anantharaman, and S. Sundaram, "Experimental Studies on Treatment of Distillery Effluent by Liquid Membrane Extraction," *Chem. Engg. J.*, **95**, 199(2003).
- ◆ Larson, K., B. Raghuraman, and J. Wienczek, "Mass Transfer Model of Mercury Removal From Water Via Microemulsion Liquid Membranes," *Ind. Eng. Chem. Res.*, **33**, 1612 (1994).
- ◆ Larson, K., B. Raghuraman, and J. Wienczek, "Electrical & Chemical Demulsification Techniques for Microemulsion Liquid Membranes," *J. Membr. Sci.*, **91**, 231 (1994).
- ◆ Lee, C. J., and C. C. Chan, "Extraction of Ammonia from a Dilute Aqueous Solution by Emulsion Liquid Membrane: Experimental Studies in Batch System," *Ind. Eng. Chem. Res.*, **29**, 96 (1990).
- ◆ Lee, C. J., S. S. Wang, and S. G. Wang, "Extraction of Trivalent Europium Via Emulsion Liquid Membrane Containing PC-88A as a Mobile Carrier," *Ind. Eng. Chem. Res.*, **B3**, 1556 (1994).
- ◆ Lee, S. C., B. S. Ahn, and W. K. Lee, "Mathematical Modeling of Silver Extraction by an Emulsion Liquid Membrane Process," *J. Membr. Sci.*, **114**, 171 (1976).
- ◆ Lee, S. C. and W. K. Lee, "Extraction of Penicillin G from simulated Media by an Emulsion Liquid Membrane Process," *J. Chem. Tech. Biotech.*, **53**, 251 (1992).
- ◆ Lee, S. C., J. H. Chang, B. S. Ahn, and W. K. Lee, "Mathematical Modeling of Penicillin G Extraction in an Emulsion Liquid Membrane System Containing only Surfactant in the Membrane Phase," *J. Membr. Sci.*, **149**, 39 (1998).
- ◆ Lee, S. C., K. H. Lee, G. H. Hyun, W. K. Lee, "Continuous Extraction of Penicillin G by an Emulsion Liquid Membrane in a Counter-Current Extraction Column," *J. Membr. Sci.*, **124**, 43 (1997).
- ◆ Li., Q., Q. Liu, K. Li, and S. Tong, "Separation Study of Cadmium through an Emulsion Liquid Membrane," *Talanta*, **44**, 657 (1997).
- ◆ Li, Q., Q. Liu, Q. F. Zhang, X. J. Wei, J. Z. Guo, "Separation Study of Cadmium through an Emulsion Liquid Membrane Using Tri isoctyl Amine as a Mobile Carrier," *Talanta*, **46**, 927 (1998).

- ◆ Li, N. N., "Separation Hydrocarbons with Liquid Surfactant membranes," U. S. Patent 3, 410, 794 (1968).
- ◆ Li, N. N., "Separation of Hydrocarbons by Liquid Membrane Permeation," *Ind. Eng Chem. Process Des. Develop.*, **10**, 215(1971a).
- ◆ Li, N. N., "Permeation Through Liquid Surfactant Membranes," *AICHE J.*, **17**, 459 (1771b).
- ◆ Li, N. N., and A. L. Shrier, "Liquid Membrane Water Treating," Recent Developments in Separation Science, N. N. Li., ed., 1, p. 163, Chemical Rubber Co., Cleveland, OH (1972).
- ◆ Li, N. N., R. P. Chan and A. I. Shrier, "Liquid Membrane Process for the Separation of Aqueous Mixtures," U. S. Patent 3, 779, 907 (1973).
- ◆ Li, N. N., "Facilitated Transport Through Liquid Membranes," *J. Membr. Sci.*, **3**, 265 (1978).
- ◆ Li, N. N., "Encapsulation and Separation by Liquid Surfactant Membranes," The Chemical Engineer, 328 (1981).
- ◆ Lissant, K. J., "Demulsification-Industrial Application Surfactant Science Series, Vol 13, Marcel Dekker, New York, 1986.
- ◆ Liu, P. Y., Y. Chu, Z. S. Wu, Z. Yau, T. R. Fang, "Application of Polybutadiene based Polymeric Surfactant Liquid Membrane Separation," *Sep. Sci. Technol.*, **30**, 2565 (1995).
- ◆ Liu, X., and D. Liu, "Modeling of Facilitated Transport of Phenylalanine by Emulsion Liquid Membranes with Di(2-Ethylhexyl)phosphoric Acid as a Carrier," *Sep. Sci., Technol.*, **33**, 2597 (1998).
- ◆ Lobrach, D, and R.J.Marr, "Emulsion liquid membranes: Modeling Mass Transfer of Zinc with bis (2-ethylhexyl) dithio phosphoric acid," *Chem. Eng. Process.*, **21**, 83 (1987)
- ◆ Longquan, Li., W.Cheng, L.Yadong, " Separation of Cobalt and Nickel by Emulsion Liquid Membrane with the use of EDTA as a Masking Agent," *J. Membr. Sci.*, **114**, 171 (1976).
- ◆ Luan, J., and A. Plaisier, "Study on Treatment of Waste Water Containing Nitrophenol Compounds by Liquid Membrane Process," *J. Membr. Sci.*, **229**, 235 (2004).
- ◆ Ma, X. S., and Y. J. Shi., " Study of Operation Condition affecting Mass Transfer rate in Liquid Surfactant membrane Process," *Sep. Sci. Technol.*, **22**, 819 (1987).

- ◆ Magdassi, S., and N. Garti, "Release of Electrolytes in Multiple Emulsions: Coalescence and Breakdown or diffusion through Oil Phase," *Colloids. Surf.*, **12**, 367 (1984).
- ◆ Marcus, Y., and A. S. Kertes, *Ion Exchange and Solvent Extraction of Metal Complexes*, Wiley-Interscience, New York (1969).
- ◆ Marr, R. J., and A. Kopp, "Liquid Membrane Technology- A Survey of Phenomena, Mechanisms and Models," *Int. Chem. Eng.*, **22**, 44 (1982).
- ◆ Marr, R. J., and J. Draxler, in *Membrane Handbook* Handbook Eds. Ho, W.S., and Sirkar K.K., Chapman and Hall, New York (1992)
- ◆ Martin, T. P., and G. A. Danes, "the Extraction of Copper from Dilute Aqueous Solution Using a Liquid Membrane Process," *Hydrometallurgy*, **2**, 315 (1977).
- ◆ Matsumoto, S., T. Inoue, M. Kohda and K. Ikurna, "Water Permeability of Oil Layers in W/O/W Emulsions Under Osmotic Pressure Gradients," *J. Colloid Interface Sci.*, **77**, 555 (1980).
- ◆ Matulevicius, E. S., and N. N. Li, "Facilitated Transport Through Liquid Membranes," *Sep. Purif. Methods*, **4**, 73 (1975).
- ◆ Maugh, T. H., "Liquid Membrane-New Technique for Separation, purification," *Science*, **193**, 134 (1976).
- ◆ Mikueki, B. A., and K. Osseo-Asare, "The Liquid Surfactant Membrane Process: Effect of the Emulsion Type on Copper Extraction by LIX65N-LIX63 Mixtures," *Hydrometallurgy*, **16**, 209 (1986).
- ◆ Mori, Y., H.Uemae, S. Hibino, W.Eguchi, "Proper Conditions of the Surfactant Liquid Membrane for Recovery and Concentration of Chromium (VI) aqueous acidic solutions" *Int.Chem.Eng.*, **30**, 124 (1990)
- ◆ Morrison I.D. and S.Ross, "Colloidal Dispersions- Suspensions, Emulsions and Foams," Wiley Interscience, New York, (2002)
- ◆ Nakashio, F., "Recent Advances in Separation of Metals by Liquid Surfactant Membranes," *J. Chem. Eng. Japan*, **26**, 123 (1993).
- ◆ Nakashio, F., M. Goto, M. Matsumoto, J. Irie, and K. Kondo, " Role of Surfactants in the Behavior if Emulsion Liquid Membranes: Development of New Surfactants," *J. Membr. Sci.*, **38**, 249 (1988).
- ◆ O'Brien, D. J., and G. E. Senske, "Separation and Recovery of Low Molecular Weight Oraganic Acids lay Emulsion Liquid Membranes," *Sep. Sci. Technol.*, **24**, 617 (1989).

- ◆ Ohtake, T., T. Hano, K. Takagi, and F. Nakashio, "Effect of Viscosity on Drop Diameter of W/O Emulsion Dispersed in a Stirred Tank," *J. Chem .Eng. Japan*, **20**, 443 (1987)
- ◆ Okamoto, Y., Y. Nomura, H. Nakamura, K. Iwamaru, T. Fujiwara, and T. Kumamaru, "High preconcentration of Ultra-Trace Metal Ions by Liquid-Liquid Extraction Using Water/Oil/Water emulsions as Liquid Surfactant Membranes," *Microchemical J.*, **65**, 341 (2000).
- ◆ Ortiz Uribe, I., S. Wongswan, E.S. Perez deOrtiz, " A Systematic Method for the Study of Rate Controlling Mechanism in Liquid Membrane Permeation Process. Extraction of Zinc by D2EHPA" *Ind.Eng.Chem. Res*, **27**, 1696 (1988)
- ◆ Pearce, C., "The Mechanism of the resolution of Water in Oil Emulsions by Electrical Treatment,"" *Br. J. App. Phy.*, **5**, 136 (1954).
- ◆ Perry, R.H., and D.W. Green Eds. Perry's Chemical Engineers Handbook, 7th Ed., McGraw Hill, New York (1997)
- ◆ Quian, X. L., X. S. Ma, and Y. J. Shi, "Removal of Cyanide from Waste Water with Liquid Membranes," *Water Treatment*, **4**, 99 (1989).
- ◆ Rautenbach, R., and O. Machhammer, Modeling of Liquid Membrane Separation Processes," *J. Membr. Sci.*, **36**, 425 (1988).
- ◆ Redbook " the chemistry of Metals recovery using LIX Reagents " Cognis corporation, Mining chemicals division (1997, 2001)
- ◆ Reihua, Z., and W.Dexian, "Extraction of Mixed Rare Earths from Aqueous Solution with Emulsion Liquid Membranes" *Water Treat.*, **4**, 165 (1989)
- ◆ Reis, M. T. A., and J. M. R. Carvalho, "Recovery of Zinc from an Industrial Effluent by Emulsion Liquid Membranes," *J. Membr. Sci.*, **84**, 201 (1993).
- ◆ Reis, M. T. A., and J. M. R. Carvalho, "Recovery of Heavy Metals by a combination of 2 processes: Concentration and Liquid membrane permeation," *Minerals Engg*, **7**, 1301 (1994)
- ◆ Reis, M. T. A., and J. M. R. Carvalho, "Modelling of Zinc Extraction from Sulphate Solution with bis (2-ethylhexylthiophosphoric acid) by Emulsion Liquid Membrane," *J. Membr. Sci.*, In press, (2004).
- ◆ Reisinger ,H., and R.Marr, " Comparison of Separation of Lactic acid and L-Leucine by Liquid Emulsion Membranes", *J. Membr. Sci.*,**80** , 85 (1993)

- ◆ Reusch,C.F and E.L.Cussler "Selective Membrane Transport"*AIChE.J.*, **19**, 736 (1973)
- ◆ Ritcey,G.M., " Commercial process for Nickel and Cobalt ,," in Handbook of Solvent Extraction, Eds. Lo, T.C., M.H.I. Baird and C.Hanson, Wiley Interscience NewYork, pp 673-688 (1983)
- ◆ Ruppert, M., J. Draxler, and R. Marr, "Liquid Membrane-Permeation and its Experience in Pilot-Plant and Industrial Scale," *Sep. Sci. Technol.*, **23**, 1659 (1988).
- ◆ Sayed, M. S. El., "Uranium Extraction from Gattar Leach Liquor Using Aliqual-336 in a Liquid Emulsion Membrane Process," *68*, 51 (2003).
- ◆ Schiffer, D. K., A. M. Hochhauser, O. F. Evans, and E.L. Cussler, "Concentrating Solute with Membranes Containing Carriers," *Nature*, 250, 484 (1974).
- ◆ Sharma, A., A. N. Goswami, and B. S. Rawat, "Drop Size Prediction in Liquid Membrane Systems," *J. Membr. Sci.*, **60**, 261 (1991).
- ◆ Shere, A. J., and H. M. Cheung, "Effect of Preparation Parameters on Leakage in Liquid Surfactant Membrane Systems," *Sep. Sci. Technol.*, **23**, 687 (1988a).
- ◆ Shere, A. J., and H. M. Cheung, "Modeling of Leakage in Liquid Surfactant Membrane Systems," *chem.. Eng. Comm.*, 68, 143 (1988b).
- ◆ Sherman, P., "Rheological Properties of Emulsions" in Encyclopedia of Emulsion Technology, Marcel Dekker, New York, pp 405-435 (1983)
- ◆ Shinnar,R., " On the Behavior of Liquid Dispersions in Mixing Vessels" *J.Fluid. Mech.*, **10**, 259, (1961)
- ◆ Skelland, A. H. P., and X. Meng, "A New Solution to Emulsion Liquid Membrane Problems by Non-Newtonian Conversion," *AIChE J.*, **42**, 547 (1996).
- ◆ Solanki, J., and B.Sengupta, " Studies in Phenol removal Using Emulsion Liquid Membranes," *Proc. SPIC*, **24** (2003)
- ◆ Sole, K.C., and P.M.Cole " Purification of Nickel by Solvent Extraction," in Ion Exchange and Solvent Extraction , Vol 15, Eds, Y.Marcus and A.K.Sengupta , Marcel-Dekker, NewYork , pp 143-145, (2002)
- ◆ Stoica-Guzin, A., C. Albulescu, G. H. Juncu, O. Floarea, "Extraction of Urea with Liquid Surfactant Membranes in a batch System," *Chem. Eng. Sci.*, **51**, 4745, (1996).
- ◆ Strove, P., and P.P. Varanasi, " Extraction with double Emulsion in a Batch Reactor: Effect of Continuous Phase Resistance," *AIChE.J.*, **30**, 1007 (1984)

- ◆ Strzelbicki, J., and W.Charewicz, " Separation of Cobalt by Liquid Surfactant Membranes,"*Sep. Sci. and Technol.* **13**, 141 (1978)
- ◆ Strzelbicki, J., and W.Charewicz, " The Liquid Surfactant Membrane Separation of Copper, cobalt,Nickel from multicomponent aqueous solutions," *Hydrometallurgy* , **5**, 243 (1980)
- ◆ Strzelbicki, J., and S. Schlosser, "Influence of Surface-Active Substances on Pertraction of Cobalt (II) Cations through Bulk and Emulsion Liquid Membranes," *Hydrometallurgy*, **23**, 67, (1989).
- ◆ Tadros, F.T., and B.Vincent, "Emulsion stability" in Encyclopedia of Emulsion technology, Vol. 1, Marcel Dekker, New York ,pp 129-285 (1983)
- ◆ Tang, J., C.M.Wai , "Transfer of Trivalent Lanthanides Through Liquid surfactant Membranes Containing an Ionizable Macroyclic Polyether," *J. Membr. Sci.* **46**, 394 (1989)
- ◆ Takahashi, K., F. Ohtsubo, and H. Takeuchi, "A Study of Stability of W/O/W type Emulsion Using a Tracer Technique," *J. Chem. Eng. Japan*, **14**, 416 (1981).
Teramoto, M., H. Takihana, M. Shibutani, T. Yuasa, Y. Miyake, and H. Teranishi, "Extraction of Amine by W/O/W Emulsion Systerm" *J. Chem. Engg.*, **14**, 122 (1981).
- ◆ Termato, M., H. Takihana, M. Shibutani, T. Yuasa, and N. Hara, "Extraction of Phenol and Cresol by Liquid Surfactant Membrane," *Sep. Sci. Technol.*, **18**, 397 (1983).
- ◆ Teramoto, M., T.Sakai, K.Yanagawa, M.Ohsuga and Y.Miyake," Modeling of the Permeation of Copper through Liquid Surfactant Membranes," *Sep. Sci. Technol.*, **18**, 735, (1983)
- ◆ Teramoto, M., and H. Matsuyama, "Effect of Facilitated Diffusion in Internal Aqueous Droplets on Effective Diffusivity and Extraction Rate of Phenol in Emulsion Liquid Membranes," *J. Chem. Eng. Japan*, **19**, 469 (1986).
- ◆ Teramoto,M., T.Sakuramoto, T.Koyama, H.Matsumoto, and Y.Miyake " Extraction of Lanthanide by Liquid Surfactant Membrane," *Sep. Sci. Technol.* **21**, 229 (1986)
- ◆ Teramoto, M., T.Yamashiro, A.Inoue, A Yamamoto, H. Matsuyama and Y.Miyake, "Extraction of amino acids by Emulsion Liquid Membranes containing di (2-ethylhexyl phosphoric acid as a Carrier. Biotechnology ; Coupled Facilitated Transport and diffusion," *J. Membr. Sci.* **58**, 11 (1991)
- ◆ Terry, R. E., N. N. Li, and W. S. Ho, "Extraction of Phenolic Compounds and Organic Acids by Liquid Membranes," *J. Membr. Sci.*, **10**, 305 (1982).

- ◆ Urtiagam A.M., A. Alonso, I. Ortiz, J. A. Daoud, S. A. El-Rufy, S. P. Ortiz, and T. Gallego, "Comparison of Liquid Membrane Processes for the Removal of Cadmium from Wet Phosphoric Acid," *J. Membr. Sci.*, **164**, 229 (2000).
- ◆ Vohra, D.K., K.S.Kaur, and A.Sharma, " Extraction of Cr(VI) from Acid (sulfate) Aqueous Media using LSM Emulsions" *Indian J.Techol.*,**27**, 574 (1989)
- ◆ Volkel, W., W. Halwachs, and K. Schugerl, "Copper Extraction by Menas of a Liquid Surfactant Membrane Process," *J. Membr. Sci.*, **6**, 19 (1980).
- ◆ Volkel, W., W. Poppe, W. Halwachs, and K. Schugerl, "Extraction of free Phenols from blood by a Liquid Membrane Enzyme Reactor," *J. Membr. Sci.*, **11**, 333 (1982).
- ◆ Walstra, P., "Formulation of Emulsion," in Encyclopedia of Emulsion Technology, Vol 1, Marcel Dekker, NewYork , pp 1-56 (1983)
- ◆ Wan, Y., X. Wang, B. Zhu, X. Zhang, "Development of a New Series of Polyamine-type polymeric Surfactant Used for Emulsion Liquid Membrane," *J. Membr. Sci.*, **184**, 49 (2001).
- ◆ Wan, Y., and X. Zhang, "Swelling determination of W/O/W Emulsion Liquid Membranes," *J. Membr. Sci.*, **196**, 185 (2002).
- ◆ Wasan, D. T., Z. M. Gu, and N. N. Li, "Separation of Metal Ions by Ligand-Accelarated Transfer Through Liquid Surfactant Membranes," *Faraday Discuss. Chem. Soc.*, **77**, 67 (1984).
- ◆ Weiss, S., V.Grigoriev, and P.Muhl, "The Liquid Membrane Process for Separation of Mercury from Wastewaters" *J. Membr. Sci.*, **12**, 119 (1982).
- ◆ Whewell ,R.J., M.A.Hughes and C.Hanson, " The Kinetics of solvent extraction of Copper(II) with LIX Reagents," *J.Inorg. Nucl. Chem.*, **37**, 2303 (1975)
- ◆ Whewell ,R.J., and C.Hanson " Metal extraction with Hydroxyoximes" Solvent Extraction and Ion Exchange , Vol 8, pp 1-93 (1981)
- ◆ Wright, J.B., D.N.Nilsen, G.Hundley and G.J.Galavan, " Field tests of Liquid Emulsion Membrane Technique for Copper Recovery from Mine Solutions," *Minerals Engg.* **549**, 8, (1995)
- ◆ Xuan-Chai, I., and X. Fu-Quan, "Study of the Swelling Behaviour of Liquid Surfactant Membranes," *J. Membr. Sci.*, **59**, 183 (1991).
- ◆ Yan, N., Y. Shi and Y. Su., "A Study of Gold Extraction by Emulsion Membranes," *Water Treat.*, **5**, 190 (1990)

- ◆ Yan, J., R. Pal, "Osmotic Swelling Behavior of Geobule of W/O/W emulsion Liquid Membrane," *J. Membr. Sci.*, **190**, 79 (2001).
- ◆ Yan. J., R. Pal, "Isotonic Swelling Behavior of W/O/W Emulsion Liquid Membranes Under agitation conditions," *J. Membr. Sci.*, **213**, 1 (2003).
- ◆ Yan., N. X., S. A. Huang, and Y. J. Shi, "Removal of Acetic Acid from Wastewater with Liquid Surfactant Membranes: an External Boundary Layer and Membrane diffusion Controlled Model," *Sep. Sci. Technol.*, **22**, 801 (1987).
- ◆ Yu, J, C. Jiang and Y Zhu, "Separation of Europium in Liquid surfactant Membranes," *Recent Dev. Sep. Sci.*, Vol 9, (1982)
- ◆ Yu, J.H., S.Z.Wang, N.Ma and C.Y. Jiang, " Extraction of zinc in an Oldshue-Rushton Column by Liquid Surfactant Membranes" *Desalination*, **63**, 315 (1987)
- ◆ Yurtov,E.V., and M.Yu, "Emulsions for Liquid Membrane Extractions : Properties and Peculiarities" Chemical Separations with Liquid Membranes , *ACS Symp Series 642*, pp 89-102 (1996)
- ◆ Zhang, R. H., and D. X. Wang, "Extraction of Mixed Rare Earths from Aqueous Solution with Emulsion Liquid Membrane, " *Water Treatment*, **4**, 165 (1983).
- ◆ Zhang, R. H., and L. Xiao, "Design of a Liquid Membrane System for Extraction Rare Earths," *Water Treatment*, **4**, 473 (1983).
- ◆ Zhang, R. H., and L. Xiao, "Design of a Liquid Membrane System for Extraction of Rare Earths," *J. Membr. Sci.*, **51**, 249 (1990).
- ◆ Zhang, X. J., J. H. Liu, and T. S. Lu, "Industrial Application of Liquid Membrane Separation for Phenolic WasteWater Treatment," *Water Treatment*, **2**, 127 (1987).
- ◆ Zhang, X. J., Q. J. Fan, X. T. Zhang, and Z. F. Liu, "New surfactant LMS-2 Used for Industrial Application in Liquid Membrane Separation In Separation Technology," Ed. N. N. Li and H. Strathmann, pp 215-226. New York. Umbo Engineering Truslus (1988).
- ◆ Zhou, G., and S. M. Kresta, "Correlation of Mean Drop Size and Minimum Drop Size With the Turbulence Energy dissipation and the Flow in an Agitated Tank," *Chem. Eng. Sci.*, **53**, 2063 (1996).