## Recommendation

The method proposed in this study might be simply scaled up and used to remove nitrate and TN from real wastewater on a large scale. Future tests on the removal of nitrate from diverse groundwater samples and improvements to the reusability of Ag-PVA beads and AgMPs as spatially suspended catalysts. Future studies can be conducted on the ECR of nitrate using  $Ti/Co_3O_4$  in various wastewater and water samples.