

OBJECT

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The role of chemistry in the petroleum industry began in 1855, 21 years before the birth of the American Chemical Society. Although petroleum oil had been known and used for thousands of years. Heretofore, oil had been obtained in small amounts from hand-dug wells, by skimming pools, and as an unwelcome product from wells drilled for salt and water. Alongwith the production of crude oils are associated problems of all sorts many of which are concerned with the rheological characteristics. The problems as such are of grave nature and may in turn effect the entire crude oil petroleum industry quite adversely.

While the discovery and utilization of crude oil hardly has a history of over a hundred and some odd years only though its presence was known to some ancient cultures, the problems are well recognised and their study is well organised by the exploring organizations. A survey of available and approachable literature reveals that very little work is reported on the study of Indian crude oils while sources of crude oils are on the increase as the exploration activity is marching ahead.

The object of this investigation is to increase the molecular weight of the polymer additives by different synthetic process. The polymer additives are same as in previous work but having increase in the molecular weight. Studies on shear rate shear stress, pour point, viscosity, viscosity index, etc. of the crude oils are of great importance in relation to their behaviour and functioning. A class of additives with definite characteristic has been utilised for altering the flow characteristics of the crude oils in view of the problematic functioning of the crude oils with reference to the technology of treating them for a variety of purposes. These aspects open up a vast vista of variables whose specific nature and characteristics should be accounted for in terms of the structural features of the moieties, the molecular forces arising therefrom and the factors that inhibit or enhance one or the other specified characteristics.

A flow improver is generally very specific in nature and may affect differently the various crude oils. As already mentioned, flow is an important characteristic of crude oils ; highly viscous crude oils are difficult to pump out and transport long or

even short distances. Problems concerning exploration of crude oils invariably affect the economy of drilling, pumping refining operations. However, this investigation concerns only with the pumping and transportation difficulties as arising out of the rheological characteristics of the crude oils.

The object of this study is thus manifold which could be categorised as under :

- (1) To study the physical-rheological characteristics of the Indian crude oils (as many of them as possible).
- (2) To synthesize a number of polymeric additives with certain functional groups. The polymer additives synthesized in this investigation are same as in previous work but having different molecular weight.
- (3) To characterize the newly synthesized polymeric additives and to study their effect on the various Indian crude oils in different compositions and varying temperatures, the properties accepted for evaluation being mainly pour point and rheological characteristics.

- (4) To differentiate and classify the newly synthesized polymeric additives as pour point depressants and or flow improvers and to evaluate their efficiency on a relative scale.
- (5) To correlate their effectivity with the molecular geometry and other associated characteristics and forces and to arrive at certain generalizations.

In order that the subject of this investigation is fulfilled to a reasonable degree crude oils from the following five oil fields :

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| (1) Bombay High | (Maharashtra) |
| (2) Nahorkatia | (Assam) |
| (3) Moran | (Assam) |
| (4) North Kadi | (Gujarat) |
| (5) Amta | (Gujarat) |