

Blending Effects on Crude Oil Stability: An Experimental Study

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Abstract : This study is a part of investigating the possibility of blending two crude oils obtained from Libyan oil fields, namely crude oil (A) and crude oil (B) with different ratios, prior to blending the crude oils have to be compatible in order to avoid phase out and precipitation of asphaltene from the bulk of crude. The physical properties of both crudes such as density, viscosity, pour point and sulphur content were measured according to (ASTM) method. To examine the stability of both crudes and their blends, the oil compatibility model using microscopic, colloidal instability index (CII) using SARA analysis and asphaltene stabilization test using Turbiscan tests were conducted in the Libyan Petroleum Institute laboratories. Compatibility tests were carried out with both crude oils, the insolubility number (IN), and the solubility blending number (SBN), for both crude oils and their blends were calculated. The criteria for compatibility of any blend is that the volume average solubility blending number (SBN) is greater than the insolubility number (IN) of any component in the blend, the results indicated that both crudes were compatible. To support the results of compatibility tests the SARA analysis was done for the fractional determination of (saturates, aromatics, resins and asphaltenes) content. From this result, the colloidal Instability index (CII) and resin to asphaltenes ratio (R/A) were calculated for crudes and their blends. The results show that crude oil (B) which has higher (R/A) and lower (CII) is more stable than crude oil (A) and as the ratio of crude (B) increases in the blend the (CII) and (R/A) were improved, and the blends becomes more stable. Asphaltene stabilization test was also conducted for the crudes and their blends using Turbiscan MA200 according to the standard test method ASTM D7061-04, the Turbiscan shows that the crude (B) is more stable than crude (A) which shows a fair tendency. The (CII) and (R/A) were compared with the solubility number (SBN) for each crude and the blends along with Turbiscan results. The solubility blending number (SBN) of the crudes and their blends show that the crudes are compatible, also by comparing (R/A) and (SBN) values of the blends, it can be seen that they are complements of each other. All the experimental results show that the blends of both crudes are more stability.

Keywords : asphaltene, crude oil, compatibility, oil blends, resin, SARA

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