

CHAPTER I

INTRODUCTION

Lubricating base oils, which are used, for example, to formulate engine lubricants and industrial oils, are normally prepared from suitable petroleum feedstocks by a variety of refining processes which are generally directed to obtain a lubricating base oil with a predetermined set of properties, for example viscosity, oxidation stability, and maintenance of fluidity over a wide range of temperatures (as indicated by viscosity index).

Viscosity index, light stability, aromatic contents are measurements which are employed in lubricating oil specifications as general indicators of the quality of the oil. The higher a viscosity index of an oil, the more resistant a viscosity change caused by temperature fluctuation. Unsaturated linkages generally are undesirable because such linkages are more readily oxidized than those of saturated linkages, especially at elevated temperatures, and such oxidation results in degradation of the oil. Therefore, a high quality lubricating oil, i.e., one that is particularly desirable for automotive uses, should possess a relatively high viscosity index.

The stability of oils is also affected by the presence of aromatic materials in an oil. The aromatic content of oils can be reduced by hydrotreating. Hydrotreating processes can be effective for the saturation of aromatic compounds to naphthenic materials without significant cracking or hydrocracking.

The upgrading of crude lubricating oil stocks by means of catalytic hydrogenation has been suggested in the art (1). Generally, the processes require, in a first stage, the treatment of the crude lubricating oil stocks with hydrogen under conditions of elevated temperatures and pressure while employing a catalyst comprising hydrogenating components (metals) supported on a carrier having a substantial degree of cracking activity such as alumina, silica, and mixtures thereof.

The objective of this study is:

To determine the optimum operating conditions for hydrogenation of lubricating base oils using a nickel catalyst.