

## **STRUCTURAL STUDIES ON RESIDUAL FUEL OIL ASPHALTENES**

### **BY RICO METHOD**

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### **ABSTRACT**

Structural characterization of asphaltenes isolated from Saudi Arabian heavy and medium crude oils was undertaken by using ruthenium ion catalyzed oxidation (RICO) method. The RICO method was capable to convert aromatic carbons selectively into carbon dioxide and carboxylic acids and esters group while leaving aliphatic and naphthenic structures of asphaltenes essentially unaffected. Detailed analyses of RICO products of both Arab heavy and Arab medium asphaltenes were conducted using FT-IR, <sup>13</sup>C-NMR, IC, GPC and GC-MS techniques. These analyses indicate that the aqueous phase fraction (water-soluble products) obtained from RICO reaction of asphaltenes consists of aliphatic dicarboxylic acids and aromatic poly carboxylic acids with longer alkyl chains. The <sup>13</sup>C-NMR and GC-MS analyses of organic phase products of asphaltenes indicate that this fraction contains large amount of aliphatic carboxylic acids with longer alkyl groups. The oxidation products of both Arab heavy and Arab medium asphaltenes were found to be dominated by a homologous series of straight chain monocarboxylic acids suggesting that the normal alkyl chains are major and important constituents of the chemical structure of both asphaltenes.