Properties and Synthesis of Alkyl Dicarboxylic Acid Derivatives for Lubricants

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Lead naphthenates as well as Mo-DTC (molybdenum dithiocarbamates) and ZDDP (zinc dialkyldithiophosphates) have been extensively used as lubricant additives on all sides. However, those contain heavy metals such as zinc, molybdenum and etc., which are not biodegadable and tend to accumulate in living organisms, causing various diseases and disorders.

A series of metal free antiwear additives has been derived from the reaction of the dicarboxylic acid derivatives and dithiophosphates via the adduct reaction of the methacrylate derivatives. The representative physical property of the synthesized [3-(3'-(dialkyloxy-phosphrothionyl)thio-2'-methylpropanoyloxy)-2- hydropropyl] alkandioate derivatives were determined by measuring the four ball test. The data of the fourball test is proportionally decreased 0.55 to 0.48 mm as the alkyl chain length of the additive is increase 6 to 12.

Key words : Diacid, lubricant additives, extreme pressure additives, bio-lubricant