463f Process Optimization in Synthesis of Lubricants: from Ome to Hism

Marcel A. Liauw, Sven Eichholz, and Sergio Sabater Prieto

In the Collaborative Research Center 442, our aim is to synthesize invironmentally friendly lubricants by modifying renewable resources, e.g. methyloleate (OME) to methyl- 10(9)-hydroxy-9(10)isobutoxyoctadecanoate (HISM). In additional to typical chemical parameters (iodine number, acid number, saponification number peroxide number etc.), gas chromatography is used to characterize the products and monitor its synthesis is with time.

Starting the synthesis from technical OME (purity 70%) leads to various side products which can be correlated with tribological, ecological and toxicological properties of the lubricant. Optimizing the synthesis route decreases the amount of side products as for example the undesired isobutyl-10(9)-hydroxy-9(10)isobutoxyoctadecanoate (HISI) or a compound that appears to cause a solidification of the oil to a grease-like substance. Typical parameters e. g. reaction temperature, used catalyst and stirring time and –speed are systematically varied.

Currently, new oils, with different OME concentrations (canola ~60% up to high oleic (HO) oils <90%) are tested in the HISM-synthesis. A possible online monitoring by spectrometric methods also will be tested with the goal of a tight quality control on the synthesized lubricants.