Impact Study ofFuel Additives in Piston Ring Cylinder Liner Contact

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1. Introduction

Transportation in Europe today mainly relies on oil which accounts for 30% energy consumption, and represents more than 20% of total emissions of greenhouse gases. Therefore, it is necessary to use environmentallyfriendly fuels.

The development of new biofuelsandenergy diversificationwoulddecreasethe emissions ofgreenhouse gases due to their reduced environmental impact [1, 2,3].In addition,frictionsinside Diesel engines are responsible for the energy lossas high as 20% oftotal energy consumption. Most of these losses are due to the contacts in the Cylinder-on-Liner part [4].

2. New biofuel for low friction

A solution to improve the performances of the fuels isthe use of "green"organic additives. In the literature, fatty acidscan improve thefriction reductionin variouslubricant matricesand lubrication regimes. These additives show very interesting friction reduction properties in fuels and biofuelsfor steel/steel contacts (Figure 1).

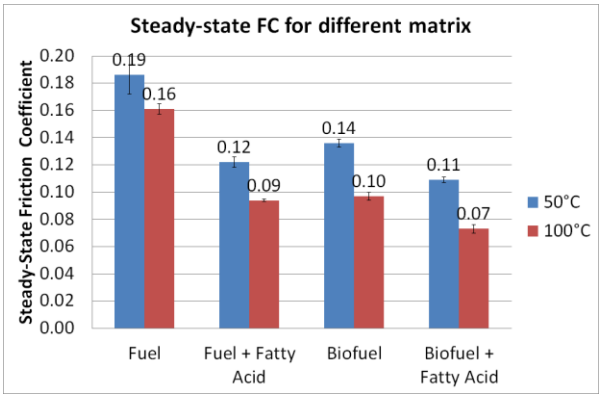

Figure 1 Variation of steady-state FC for different fuel matrices using a reciprocating linear tribometer at 270Mpa, 70mm/s and employing a right cylinder on flat geometry

3. Surface analysis

In this study, surface analysistechniques, like XPS,have been used to understand the mechanismsoffriction reduction occurring in fuel matrix containing fatty acids, but also in order to controlthesynergistic effects as well as to update futureformulations (Figure 2).

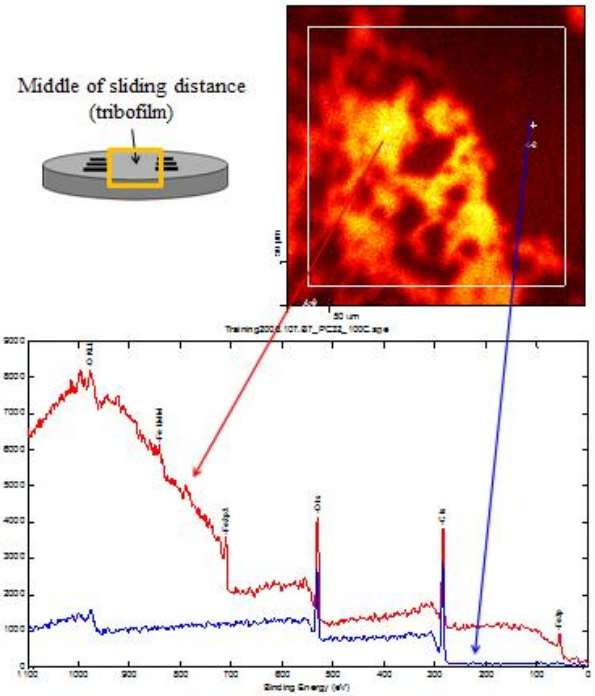

Figure 2 XPS spectra obtained in middle of tribofilm after friction test in fuel matrix with biodiesel + fatty acid at 100 ° C.

4. References

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