

Abstract Submitted  
for the MAR08 Meeting of  
The American Physical Society

**Molecular origin of oil resistance of polyacrylonitrile: CN interactions at the surface** VERONIQUE LACHAT, ALI DHINOJWALA, The University of Akron, DENNIS PEIFFER, MOHSEN YEGANEH, ExxonMobil Corporate Strategic Research Laboratories — Nitrile rubber (NR) is a random copolymer of acrylonitrile and butadiene and is one of the best oil resistance polymers. The superior oil resistance property of nitrile rubber is thought to be directly related to the amount of acrylonitrile used in NR. Here, we report for the first in-situ sum frequency generation spectroscopy characterization of polyacrylonitrile/oil interactions. We demonstrate that CN-CN interaction is the chief reason for superior oil resistance property of NR. At room temperature, the interaction between the polymer chains is much stronger than the interaction between the polymer and solvent molecules including water and heptane. However, at high temperatures, the interaction between the nitrile groups of the polymer weakens making the interaction between the nitrile groups and the surface hydroxyls of the substrate and water possible.

Ali Dhinojwala  
The University of Akron

Date submitted: 27 Nov 2007

Electronic form version 1.4