

Abstract Submitted
for the MAR12 Meeting of
The American Physical Society

Protected TERS Probes for the Study of Polymer Surfaces REBECCA AGAPOV, The University of Akron, Dept. of Polymer Science, Akron, OH, ALEXEI SOKOLOV, Chemical Sciences Division, ORNL and Department of Chemistry, University of Tennessee, Knoxville, TN, MARK FOSTER, The University of Akron, Dept. of Polymer Science, Akron, OH — The chemistry of polymer surfaces can potentially be imaged with high ($\sim 20\text{nm}$) lateral resolution using Tip Enhanced Raman Spectroscopy (TERS). The method's applicability can be tremendously broadened if the metallized tips central to the technique can be made more robust. Protecting the TERS probes with alumina coatings reduces chemical, mechanical, and thermal degradation, prolonging the use lifetime. Most recently we have focused on the detailed effect of the protective coating for cases in which the enhancement is particularly strong. "Blinking", which is characteristic of extreme enhancement, has been observed with TERS on polymer films for the first time. An alumina coating prolongs the duration of blinking from 20 min to 30 h, greatly extending the experimental window of extreme enhancement. The protective coating is also helpful for illuminating the mechanism behind blinking. Our results are consistent with thermal diffusion of molecules as the major mechanism facilitating blinking.

Rebecca Agapov
The University of Akron, Dept. of Polymer Science, Akron, OH

Date submitted: 15 Nov 2011

Electronic form version 1.4