

Advances in Fundamental Materials Research

Raman Chemical Imaging to Characterize Chemical Transport in Polyurethane Coatings

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Raman chemical imaging is being used to study the composition of Polyurethane Coatings, as well as transport of simulants through the polymer. Since it is a vibrational spectroscopic technique, Raman chemical imaging is capable of providing information on molecular identification with three-dimensional spatial resolution. For complex materials such as coatings systems, this can reveal significant information that is difficult to obtain with other techniques. We are measuring a series of free films ranging from pure polyurethane films, intermediate compositions with additional additives, and fully formulated coatings, to determine the influence of adding successive components. The properties of the systems, including transport, are known to be highly dependent on the overall composition, and chemical imaging can help to elucidate this. By obtaining spatially resolved molecular information, the distribution of materials that have permeated into the material has the potential to be obtained. In addition to chemical imaging of coating films, initial results on transport of simulants into the films will be presented (ECBC Abstract # 9).

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