

Plagens Howard

From: McAtee Nancy
Sent: Friday, November 13, 2015 11:32 AM
To: Plagens Howard
Cc: Budinski Michael
Subject: WPR14LA361 email report-material found in control tube

Howard,

A viscous liquid was observed by on-scene investigators flowing from inside a fractured control tube. By the time the control tube arrived at the Materials Laboratory, the liquid had hardened into a glossy, gray-beige polymeric solid. A sample of the solid material was removed for examination. The unknown material was examined using a Fourier Transform Infrared (FTIR) spectrometer with a diamond attenuated total reflectance (ATR) accessory in accordance to ASTM E1252-98 (American Society for Testing Materials E1252-98: *Standard Practice for General Techniques for Obtaining Infrared Spectra for Qualitative Analysis and American Society for Testing Materials*). The spectrometer was used to collect and process infrared wavelength absorbance spectra of the unknown material.

The spectrum contained spectral peaks that corresponded to particular functional groups found within molecular structure of the unknown material. The presence of a broad peak between $\sim 3600\text{ cm}^{-1}$ and $\sim 3050\text{ cm}^{-1}$ is indicative of an nitrogen-hydrogen bond. A doublet peak at $\sim 2923\text{ cm}^{-1}$ and $\sim 2853\text{ cm}^{-1}$ corresponds to a carbon-hydrogen stretching bond. A single peak at $\sim 1730\text{ cm}^{-1}$ is indicative of a carbon-oxygen double bond (carbonyl). A medium strength single peak at $\sim 1593\text{ cm}^{-1}$ is indicative of a nitrogen-hydrogen (2) bending bond. A single medium peak at $\sim 1456\text{ cm}^{-1}$ is indicative of a carbon-hydrogen (2) bending bond.

The spectrum from the unknown material suggested that the material contained an amine and a carboxylic acid. A spectral library search did not find a strong spectral match to a single material. A mixture analysis search was then done. The search found the spectrum contained spectral signatures for emulsifiers, surfactants and amines. The combination of these materials are often found in corrosion inhibiting compounds.

If you have any question, please let me know.

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RE-30