

Fox Todd

From: McAtee Nancy
Sent: Thursday, November 10, 2022 5:09 PM
To: Fox Todd
Cc: Budinski Michael
Subject: Email report-(CEN21LA187) Debris in fuel filter screen
Attachments: 187 Fuel filter FTIR sample 100X.jpg

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Todd,

The fuel filter screen of the accident aircraft was submitted to the Materials Laboratory. A white fibrous material was removed from the surface of the screen. I've attached a photograph of the material.

The unknown material sample was examined using a Fourier Transform Infrared (FTIR) spectrometer with a diamond attenuated total reflectance (ATR) accessory in accordance with ASTM E1252-98R21 (American Society for Testing Materials E1252-98: *Standard Practice for General Techniques for Obtaining Infrared Spectra for Qualitative Analysis*). The spectrometer was used to collect and process infrared wavelength absorbance spectra of the unknown material. The spectrum for the materials contained the following combination of spectral peaks corresponding to particular functional groups found within the molecular structure of the material. The presence of a broad peak at $\sim 3330\text{ cm}^{-1}$ is indicative of an oxygen-hydrogen (O-H) bond. The presence of a strong doublet peak between $\sim 2899\text{ cm}^{-1}$ is indicative of a carbon-hydrogen (C-H) single stretching bond. A peak at $\sim 1572\text{ cm}^{-1}$ is indicative of a carbon-oxygen (C-O) stretching bond. A strong peak at $\sim 1316\text{ cm}^{-1}$ is indicative of an oxygen-hydrogen (O-H) deformation bond. A doublet peak at $\sim 1161\text{ cm}^{-1}$ and 1107 cm^{-1} is indicative of a carbon-oxygen-carbon (C-O-C) bond. The spectrum was consistent with a carbohydrate. A strong peak at $\sim 1161\text{ cm}^{-1}$ is indicative of a carbon-hydrogen (C-H) out-of-plane deformation bond. A spectral library search was performed on the unknown spectrum. The spectral search found a match to cellulose. Cellulose is found in natural plant fibers like paper and cotton. The spectra of known samples of white paper and white cotton were also compared to the unknown sample and exhibited strong matches.

If you have any questions, feel free to contact me.

Nancy B McAtee
Chemist
RE-30



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