

From: [McAtee Nancy](#)
To: [Nixon Albert](#)
Cc: [Budinski Michael](#)
Subject: Email report-WPR22LA138 (Unknown material in fuel filter)
Date: Monday, December 19, 2022 11:08:22 AM
Attachments: [WPR22LA138 material from fuel filter.jpg](#)
[WPR22LA138 blue foam material 2.jpg](#)
[WPR22LA138 material used to make sealant.jpg](#)
[WPR22LA138 red foam material.jpg](#)

Albert,

An off-white particulate material removed from the fuel filter of the accident aircraft. The unknown material was submitted to the Materials Laboratory. Known samples of two types of foams and uncured sealant material used in the aircraft were submitted for comparison. Photographs of all submitted samples are attached to this email report. The samples were each examined using a Fourier Transform Infrared (FTIR) spectrometer with a diamond attenuated total reflectance (ATR) accessory in accordance with ASTM E1252-98 (American Society for Testing Materials E1252-98: *Standard Practice for General Techniques for Obtaining Infrared Spectra for Qualitative Analysis*). The spectrometer collected and processed infrared wavelength absorbance spectra of the unknown material.

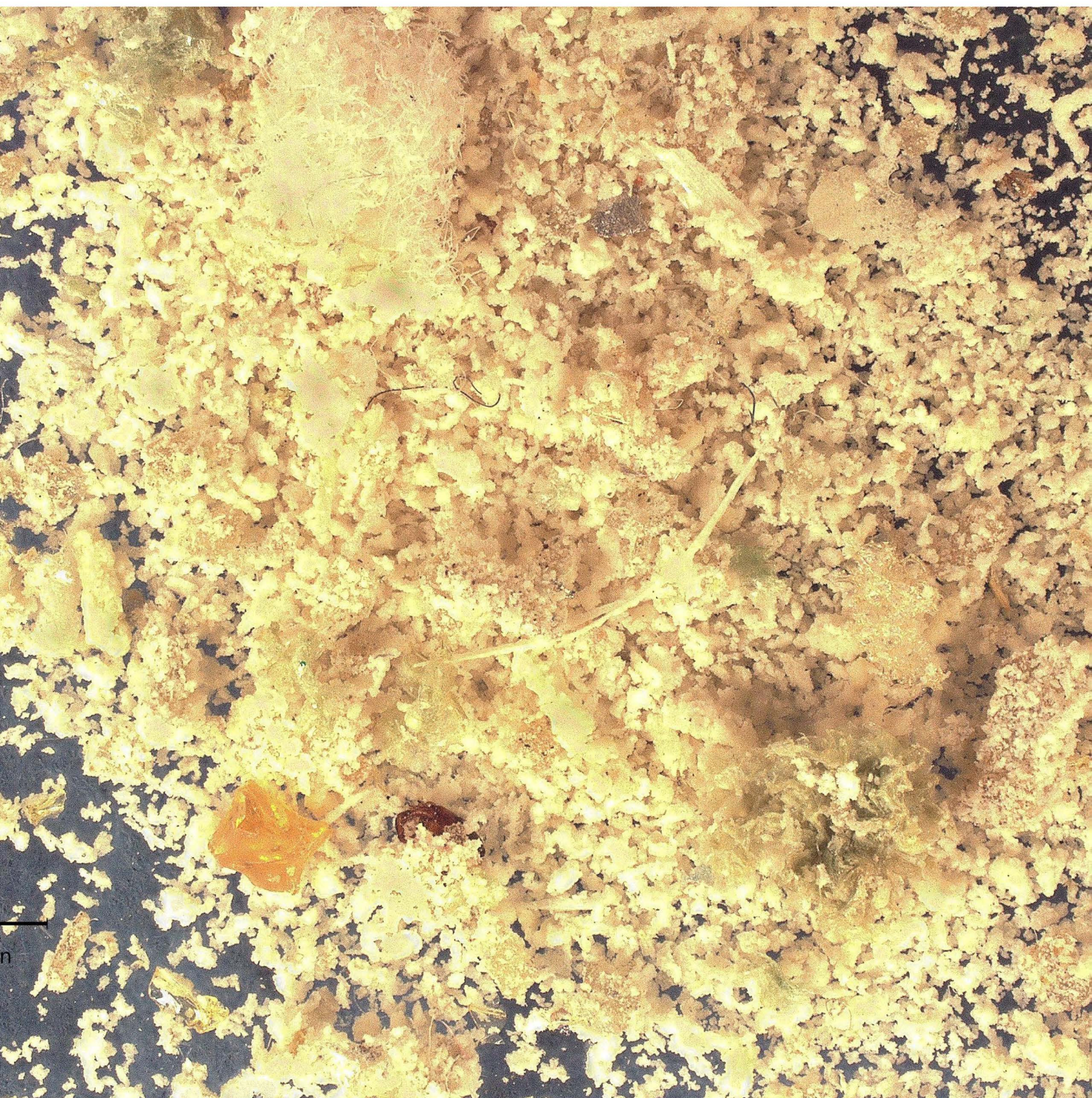
The spectrum for the unknown material contained the following combination of spectral peaks corresponding to particular functional groups found within the molecular structure of the material. The presence of a low, broad peak $\sim 3370\text{ cm}^{-1}$ is indicative of an oxygen-hydrogen (O-H) bond. The presence of a doublet peak at $\sim 2920\text{ cm}^{-1}$, and $\sim 2870\text{ cm}^{-1}$ is indicative of a carbon-hydrogen (C-H) stretching bond. A peak at $\sim 1730\text{ cm}^{-1}$ is indicative of a carbon-oxygen (C=O) double bond. A peak at $\sim 1600\text{ cm}^{-1}$ is indicative of double bonded carbon-carbon (C=) stretching bonds. Peaks at $\sim 1500\text{ cm}^{-1}$, $\sim 1080\text{ cm}^{-1}$ and $\sim 830\text{ cm}^{-1}$ are indicative of carbon-hydrogen (C-H) stretching bonds attached to a ring (aromatic) structure. Peaks $\sim 1450\text{ cm}^{-1}$ and $\sim 1360\text{ cm}^{-1}$ are indicative of oxygen-hydrogen (O-H) bending bonds. A peak at $\sim 1300\text{ cm}^{-1}$ is indicative of carbon-carbon double (C=C) deformation bonds. Peaks at $\sim 1240\text{ cm}^{-1}$ and 1030 cm^{-1} are indicative of a carbon-oxygen-carbon (C-O-C) bond. A peak at $\sim 1180\text{ cm}^{-1}$ is indicative of a carbon-oxygen (C-O) bond. A peak at 600 cm^{-1} is indicative of an oxygen-carbon-oxygen (O-C-O) bond. The spectrum was consistent with an epoxide.

A spectral library search using the unknown material spectrum found matches to several epoxy resins and sealants. The unknown material did not match any of the known materials submitted for comparison including the known sealant sample. This sample was not a match likely due to its uncured state. The unknown sample appeared to have cured based on its appearance and the similarities to the spectral matches found in the library search.

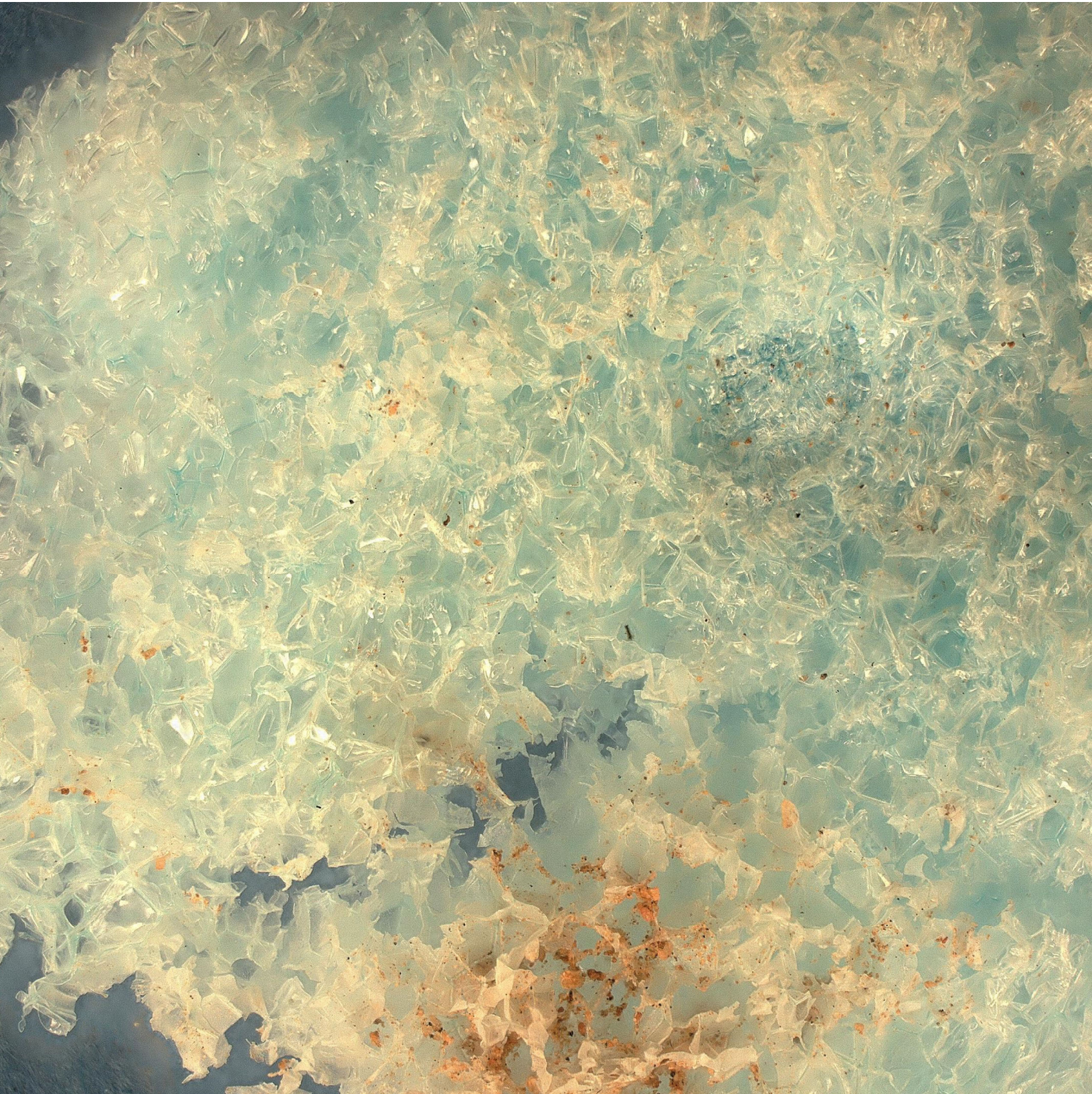
If you have any questions, please let me know.

Nancy B McAtee
Senior Chemist
RE-30

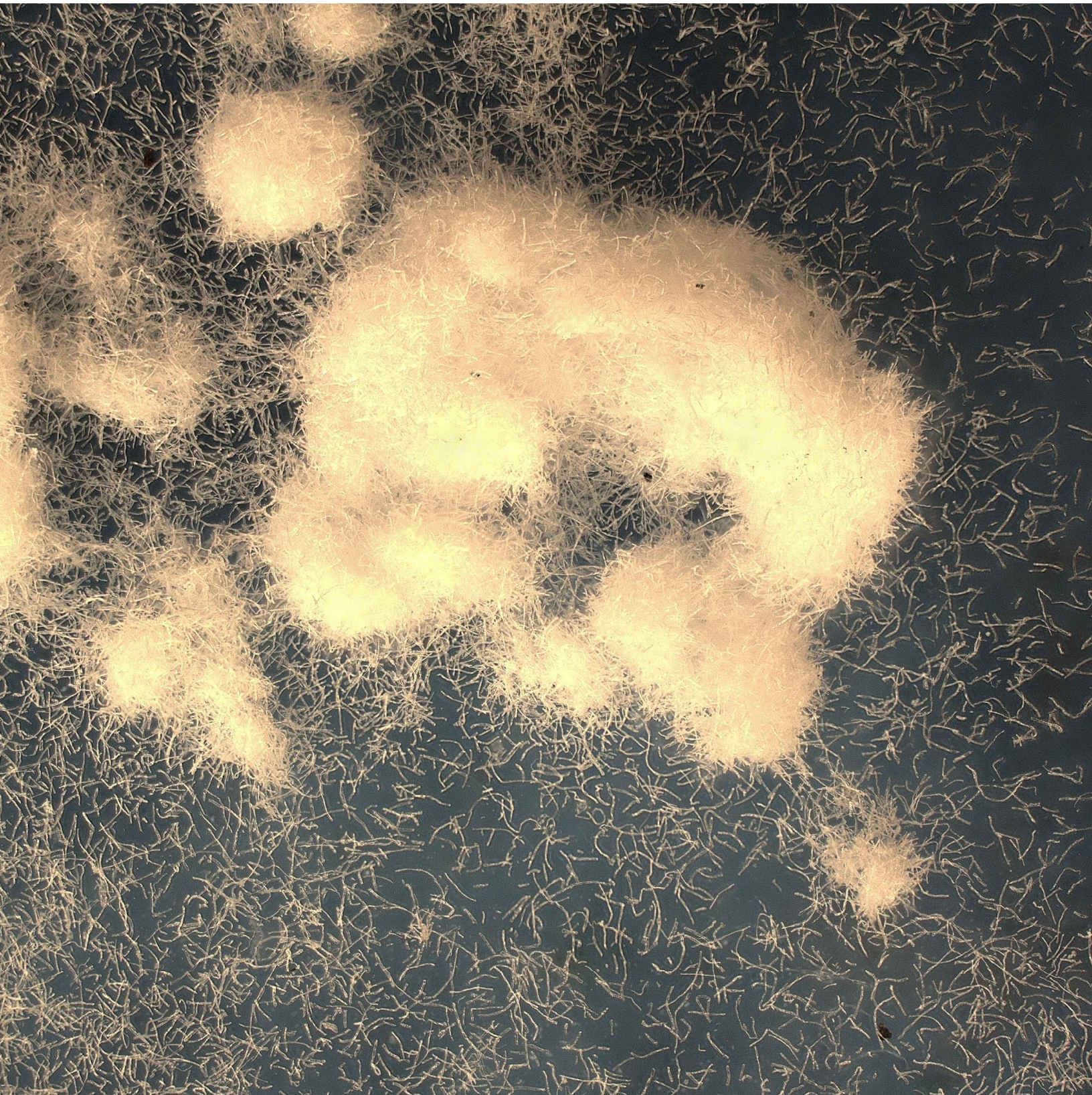
WPR22LA138 Material From Fuel Filter



WPR22LA138 Blue Foam Material



WPR22LA138 Material Used To Make Sealant



WPR22LA138 Red Foam Material

