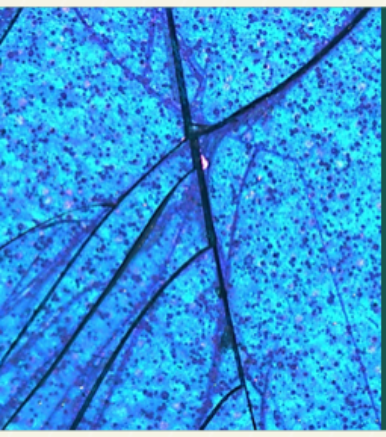
HYDROLYSIS

Why some plastics tend to crack in humid environments?

WHAT IS HYDROLYSIS AND WHEN DOES IT MATTER

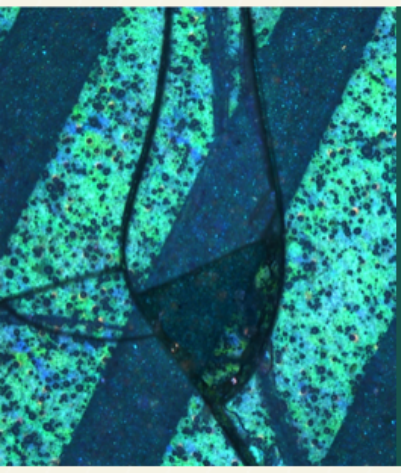


IN HYDROLYSIS ...

Absorbed moisture breaks polymer chains. This causes plastics to become fragile and brittle. As a result the plastic part may crack leading to failures.

EFFECT OF ENVIRONMENT

Hydrolysis occurs in high humidity and temperature environments. The temperature must typically be above the glass transition temperature (Tg) of plastic material. Presence of chemicals such as acids may significantly accelerate the process.



HYDROLYSIS REACTION

In hydrolysis plastic material reacts with water molecules. This causes the long polymer chains of the plastic to break. Plastics with certain chemical structures - ester, amide and carbonate groups - are prone to this reaction.

CRITICAL POLYMERS AND PLASTICS

Polyesters, polycarbonates and polyamides are especially vulnerable to hydrolysis. Remember this when using plastics like PET, PEN, PBT, PA and PC.

EFFECTS FOR RELIABILITY ANALYSIS

Humidity testing conditions should always be chosen carefully. The Tg of the plastics prone to hydrolysis should not be exceeded unless environments causing hydrolysis are present in use conditions. For example the widely used 85°C/85%RH humidity test exceeds the Tg of many plastic materials!