Environmental Stress Corrosion of Polybutylenterephtalate: A Common Material for Electronic Housings

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The glass fibre reinforced PBT Polybutyleneterephtalate is used in high volumes for housings for second level packaging of electronics. Water tight PBT housings are used to protect against corrosive environments. These housings are mounted with metallic fixtures (screws, bushings, brackets and sheet metal). Corrosion of these fixtures will occur under exposure to external environments. Bimetallic and crevice corrosion can produce alkaline conditions. Increase in pH upto 13.5 was measured. The PBT is sensitive against alkaline induced stress cracking (ESC environmental stress cracking). A combination of internal stress in PBT and impact of alkaline conditions produced by corrosion can cause crack-formation in the housing. If these cracks reach internal electric conductors of the housing, the second level package fails.

Remedies: Avoidance of bimetallic or crevice corrosion of the housing fixtures and on the other hand reduction of residual internal stress in the PBT and change to hydrolysis resistant PBT. Hydrolysis resistant PBT´s, i.e. PBT´s with additives against hydrolytic decay due to hot water, are significantly less sensitive against alkaline induced ESC.