A Study on Improvement of Heat Resistance of FRP for Salt Water Condition.

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Stainless steel is used for salt manufacturing apparatus, then more cheap substitute material is desired. Fiber reinforced plastic which has good corrosion resistance is examined as the substitute, but FRP has low heat resistance. Then, improvement of heat resistance of FRP was examined by inorganic particulate filled resin. Filled-particulate effect on heat resistance and thermal shock resistance was evaluated and discussed.

The heat resistance was evaluated by TMA with sine curve loading of 3-point bending. Tg was obtained by tan δ and E" peak temperature, and HDT was determined by modulus E. HDT increased with particulate content by increasing modulus, on the other hand, Tg was the same as neat resin. Although Tg was same value, HDT of silica filled resin was evaluated lower than that of alumina filled resin. For only silica filled resin, fracture of the particulate was recognized by SEM observation. Then, strong filler was desired for heat resistance improvement.

Thermal shock resistance was evaluated by the thermal shock test using pre-notched disk type specimen. Thermal shock resistance was decreased with alumina filler content. This tendency can be explained by filler / matrix resin adhesion. That was, alumina filled composite had weak adhesion, and then crack would easily propagate along the debonded interface. Then, good adhesion was desired for high thermal shock resistance.

The effect of filler content on heat resistance of FRP should be examined with fiber reinforced composite, and also the matrix resin should be discussed to actual use. The effect of filler on thermal shock resistance ofP particulate filled FRP also should be examined.