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Behavior and Mechanisms of Degradation of Thermosetting Plastics in Liquid Environments

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Behavior and mechanisms of degradation of thermosetting plastics used as FRP-matrix and GFRP in liquid environments are reviewed based on our experimental findings. The forms of chemical degradation were classified into three types, 'surface reaction type,' 'corrosion layer forming type' and 'penetration type.' The mechanism of each type is dependent on the chemical structures of the resin, the reactivity between resins and liquids, and the diffusivity of liquid in the resins.

The corrosion rate was defined as change of corrosion thickness with immersion time in the 'surface reaction' and 'corrosion layer forming type' corrosion. By applying the concept of corrosion rate, the residual thickness of the non-corroded region after corrosion could be predicted. For 'surface reaction' and 'corrosion layer forming type' corrosion, a life-prediction method was proposed using the master curve focused on retention of flexural strength after corrosion. For 'penetration type corrosion,' the weight change was important to predict the initiation of decrease in mechanical strength.

Keywords: [Thermosetting resin](#), [Corrosion](#), [Physical degradation](#), [Chemical degradation](#), [Corrosion rate](#), [Life prediction](#)

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