

## **Corrosion of E-glass Fibers in Acidic Environments**

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### **Abstract**

This study is concerned with the corrosion behavior of E-glass fibers exposed to oxalic, hydrochloric, nitric and sulfuric acids. The results reveal that acid corrosion of E-glass fibers is primarily attributed to calcium and aluminum ion depletion. The leachability of these metallic ions is not only determined by the hydrogen ion concentration but also strongly affected by the anions in the acids. The formation of insoluble salts or complex ions between the anions in oxalic and sulfuric acids and calcium and aluminum ions leached out from the glass accelerates fiber corrosion considerably. Furthermore, acid corrosion may generate axial or spiral cracks on the fiber surface, depending on acid type and concentration. In this study, an ion-depletion-depth model is proposed to explain the mechanisms of fiber surface cracking; the axial crack formation is most likely associated with a larger ion-depletion depth than the spiral crack formation.