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Aging and repair in epoxy-matrix composites

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Keynote: Epoxy matrix composites are widely used in various applications in industry, including wind turbine blades. Blades are critical components of a wind turbine power generation system. Service conditions may be complex, and environmental factors such as temperature, humidity, UV radiation, or aggressive fluids may lead to the formation of microcracks and degradation of the polymeric matrix, which affect the properties of the composite. Alternatives with the potential of extending the service life of composites and reducing maintenance cycles, while maintaining the original mechanical properties of the material, are therefore of great interest. This work shows aging studies of epoxy-matrix composites, including observed chemical alterations and variations in the mechanical properties of the composite material. Investigations related to the healing of composite materials with the addition of self-healing agents, which may potentially heal microcracks and extend the service life of composite materials, are presented. Different approaches of self-healing techniques in composite materials are discussed.