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Effect of processing parameters on hydrotalcite (HTC) coating microstructure and the corrosion behavior of HTC coated AA 6061 alloy

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Pitting corrosion of the aluminium cladding of spent nuclear fuels stored in light water pools has been observed. To prevent this, coating of the Al cladding with hydrotalcite (HTC) was proposed. This paper presents the effect of various processing parameters on HTC microstructure and the corrosion behavior of HTC coated AA 6061 specimens. The HTC coating from the high temperature nitrate bath was homogeneous, thicker and consisted of well-defined intersecting platelets than that formed from the room temperature carbonate bath. Electrochemical polarization measurements as well as long term exposure to aggressive aqueous media of HTC coated AA 6061 specimens revealed that specimens coated with HTC from the nitrate bath and further treated in a cerium salt solution were the most resistant to corrosion. The mechanism by which the HTC coating and cerium protect the Al alloy is discussed.