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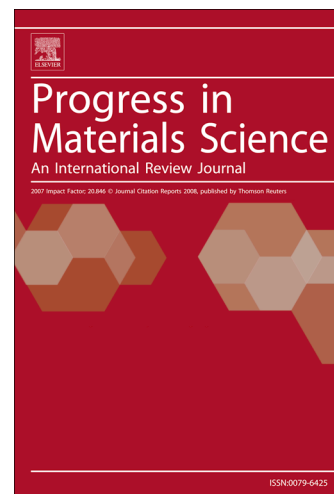
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# Corrosion in the Molten Fluoride and Chloride Salts and Materials

## Development for Nuclear Applications

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### ABSTRACT

Next-generation nuclear reactor concepts and advanced techniques for reprocessing spent nuclear fuel (SNF) are drawing great attention in the nuclear field. Molten halide salts have been proposed as the fuel solvent and coolants for many molten salt reactor (MSR) concepts, and the electrolyte for the electrochemical separation of the SNF. The major concern of using molten salts is the corrosion of the structural materials imposed by these extreme environments. Materials corrosion is more challenging in the molten salt nuclear systems than in the traditional water reactors as the formation of the passivating oxide layer on the corrosion resistant alloys becomes thermodynamically unfavorable in molten salts and the use of many corrosion resistant alloys is restricted. This review takes a comprehensive approach covering all relevant work in the field: corrosion data accumulated since the 1950s to date, major corrosion problems and corresponding mechanisms, metallurgical factors, historical development of corrosion resistant alloys and recent attempts. The key environmental factors influencing corrosion in various nuclear systems, electrode

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