

Dissolution behaviors of corrosion products on 316LN stainless steel in different simulated shutdown acid-reducing water chemistry environments

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Abstract The activated corrosion products are the main radiation source of primary system. During the shutdown process of pressurized water reactor (PWR) nuclear power plants (NPPs), the activated corrosion products can be released into the primary coolant and removed so that the radiation dose of the primary system is reduced [1,2]. The research on dissolution behaviors of corrosion products during the shutdown process is important in dose estimation and optimization of radiation protection. The dissolution behaviors of corrosion products on 316LN stainless steel (SS) under different simulated shutdown acid-reducing water chemistry were investigated. The outer Fe-rich corrosion products formed in primary operation water chemistry dissolved during the simulated shutdown acid-reducing process. NiFe_2O_4 began to dissolve at the initial stage of boration, but the dissolution of Fe_3O_4 mainly occurred at the low-temperature stage during acid-reducing process. Low pH value and low temperature conditions are conducive to the dissolution of the outer Fe-rich oxides.

Keywords 316LN stainless steel; Corrosion products; Shutdown; Acid-reducing water chemistry

Reference

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