

## A Review on Noble Metals in Controlling Intergranular Stress Corrosion Cracking in BWRs

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### ABSTRACT

Intergranular stress corrosion cracking (IGSCC) is common in boiling water reactor (BWR) components. Corrosion problem is a serious matter that has overwhelmed the light water reactor (LWR) industry for many years. The conditions in which IGSCC takes place due to stress, a sharpened microstructure and an environment that will facilitate the cracking while injecting H<sub>2</sub> into the feed water system. Nuclear reactor made up of stainless steel facing serious intergranular stress corrosion cracking due to the injection of hydrogen dosage into the nuclear reactor in the form of heavy water chemistry. Moderately large concentrations of H<sub>2</sub> may be essential in nuclear power plants to bring the ECP below the critical value of -230 mV (SHE) to ease intergranular stress corrosion cracking, which in turn results in an increase of steam line dose rate and shutdown dose rate and hence heavy water chemistry is limited in the nuclear reactor plant. Hence this led to the development of the concept called noble metal chemical addition (NMCA) to control IGSCC even in the presence of H<sub>2</sub>. This review gives the insights and development of NMCA on corrosion control in BWRs.

**Keywords:** Intergranular stress corrosion cracking, Boiling water reactor, Heavy water chemistry, Electrochemical Corrosion Potential, Noble metal chemical addition.

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