“Cr and Co Release Reduction from Stainless Steels in PWR and BWR“

Mr. Tetsuo Yokoyama, Sumitomo Metal Industries, Ltd.

The Co content in stainless steel directly affects the Co release into coolant. Also, Cr lowers pH by being released into coolant. When pH is lowered, the solubility of Ni-Cr ferrite containing Co increases, which increases metal release. Therefore it is effective to reduce the Cr release through pre-filming while lowering the Co content in stainless steel for the purpose of dose rate reduction.

To lower the Co content, scraps containing low Co content should be carefully selected, blended, and the molten iron should be used.

Pre-filming is a process to form a layer of Cr and Si oxides through the selective oxidation of Cr and Si, which prevents metal release. The test was carried out in the laboratory by performing heat treatments under various dew points while flushing with hydrogen gas.

The Cr release rate is reduced to about 1/3 the previous level by the pre-filming treatment. The inner layer of oxide film consists of a mixed oxide of CrMn and a small amount of Fe_2O_3.