APT CHARACTERIZATION OF HIGH NICKEL RPV STEELS

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The microstructures of high and low copper reactor pressure vessel steels with high nickel contents have been characterized in the local electrode atom probe to investigate the influence of high nickel levels on the response to neutron irradiation. Atom probe tomography revealed nickel-, manganese-, and silicon-enriched precipitates in VVER 1000 base (0.05% Cu,1.26% Ni, 0.46% Mn) and weld (0.07% Cu,1.78% Ni, 0.80% Mn) materials after neutron irradiation. A high number density of copper-, nickel-, manganese-, silicon- and phosphorus-enriched precipitates were observed in the Palisades reactor weld (0.20% Cu, 1.20% Ni, 1.27% Mn) after neutron irradiation.

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