

## **Effect of mixed rare earth oxide gel coatings on the high temperature oxidation behavior of iron-chromium alloys**

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The use of rare earths (RE) to improve high temperature oxidation resistance of chromia and alumina forming alloys is well known. The RE can be added as an alloying element or oxide (to form a dispersion) or applied as a coating to the alloy surface. The influence of coating Fe20Cr alloy specimens with nanocrystalline single or mixed gels of CeO<sub>2</sub>, La<sub>2</sub>O<sub>3</sub>, Pr<sub>2</sub>O<sub>3</sub>, Nd<sub>2</sub>O<sub>3</sub>, CeO<sub>2</sub> + Pr<sub>2</sub>O<sub>3</sub>, CeO<sub>2</sub> + La<sub>2</sub>O<sub>3</sub> and CeO<sub>2</sub> + Nd<sub>2</sub>O<sub>3</sub> on its isothermal oxidation behavior at 1000° C has been studied. The morphologies and the compositions of the gels as well as the gel mixtures were determined by SEM and XRD. The RE oxide coating increased oxidation resistance. Specimens coated with a mixture of two RE oxide gels exhibited higher oxidation resistance compared to specimens coated with gels of either oxide. The specimen coated with CeO<sub>2</sub> + La<sub>2</sub>O<sub>3</sub> exhibited the highest oxidation resistance. The influence of the different RE oxide gel mixtures on oxidation behavior of the alloy will be compared based on gel morphology, gel composition and ionic radii of the RE ions.