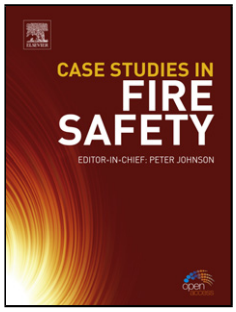


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# Electrochemical corrosion of a noble metal-bearing alloy-oxide composite

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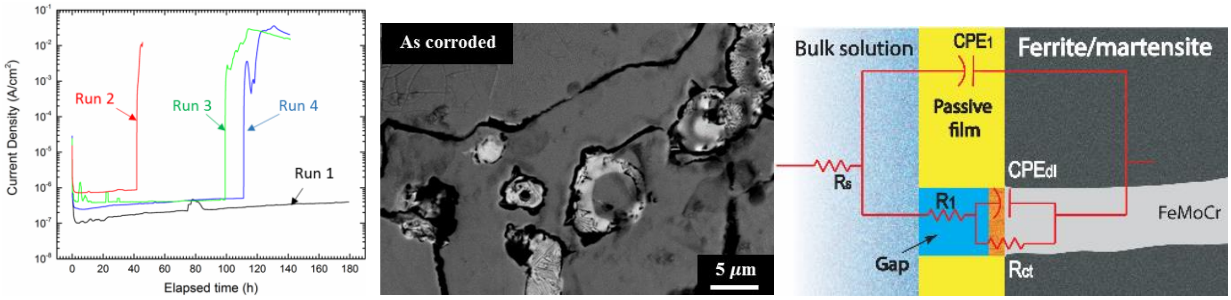
## Graphical abstract




Highlights

- The impact of noble metals on durability of a composite material was evaluated.
- Electrochemistry and microscopy were related electrical and physical changes.
- Noble metals stabilized ferrite and martensite physically and electrochemically.
- Formation and degradation of a passive film at 400mV$_{SCE}$ was characterized by EIS.
- Equivalent circuit modeling indicated degradation was due to localized breakdown.

## Abstract

The effects of added Ru and Pd on the microstructure and electrochemical behaviour of a composite material made by melting those metals with AISI 410 stainless steel, Zr, Mo, and lanthanide oxides were assessed using electrochemical and microscopic methods. The lanthanide oxides reacted with Zr to form durable lanthanide zirconates and Mo alloyed with steel to form FeMoCr intermetallics. The noble metals alloyed with the steel to provide solid solution strengthening and inhibit carbide/nitride formation. A passive film formed during electrochemical