Title: Investigation of corrosion mechanism in Type 304 stainless steel under different corrosive environments: A SIMS study

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Investigation of corrosion mechanism in Type 304 stainless steel under different corrosive environments: A SIMS study

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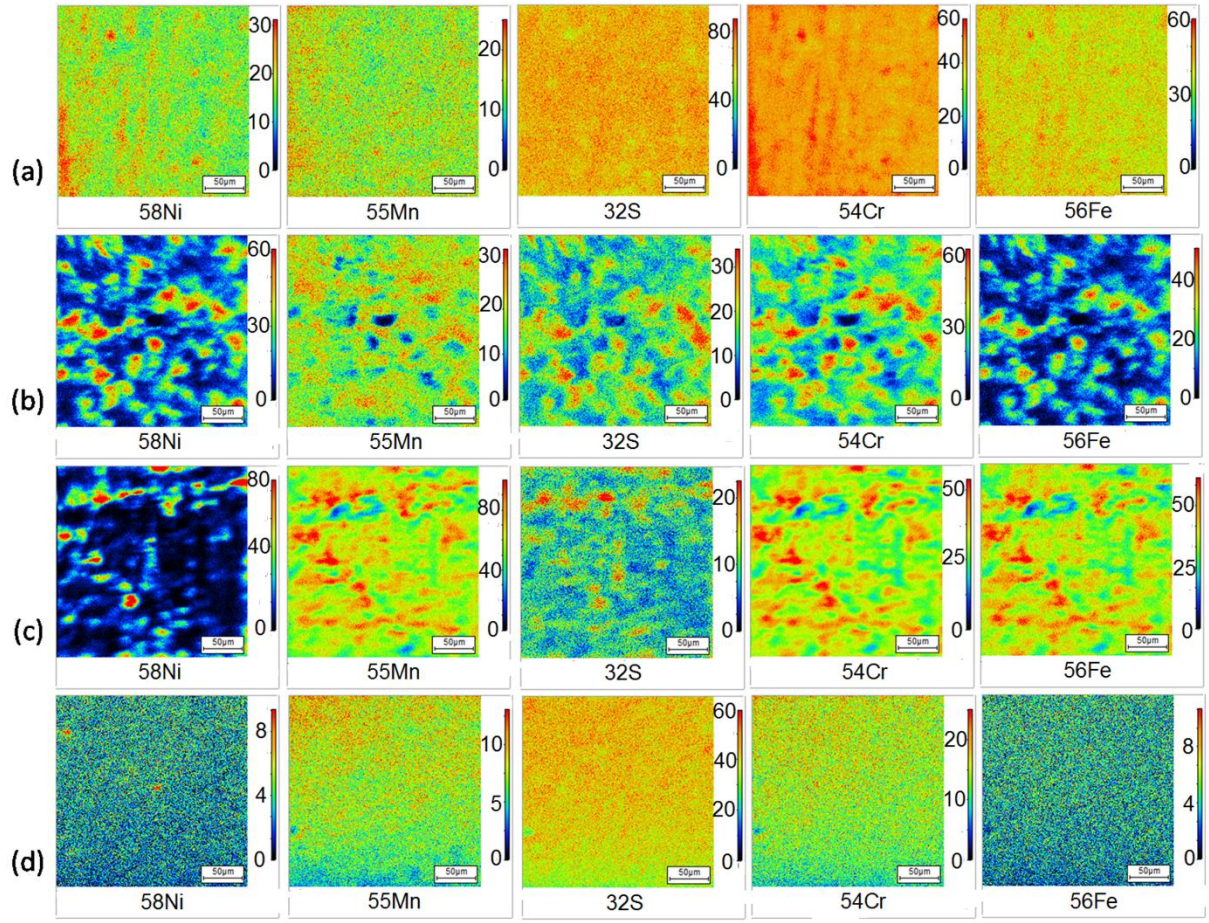
Graphical Abstract

Surface ion distribution images of various alloying elements in (a) Virgin 304 SS (b) exposed to 10M of HCl (c) exposed to 10M of H_2SO_4 and (d) exposed to 10M of HNO_3 acidic environments, acquired by SIMS.



Highlights:

- Investigation of corrosion mechanism in Type 304 stainless steel using SIMS.
- Samples were exposed to various acidic environments.
- Investigation of surface microstructure revealed localized attack of Cl in chloride solutions.
- Mass spectra and depth analyses concluded that attack of sulphur species were associated with the formation of oxide and hydroxide species in case of H_2SO_4 treated sample.
- Depth analysis indicated formation of passive layer in case of HNO_3 treated sample.
- HNO_3 was least reactive compared to HCl and H_2SO_4.