

## Preparation of Au nano-tips for *in-situ* Investigation of Early-Age Localized Corrosion of Three Metals by Scanning Electrochemical Microscope

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In this work, scanning electrochemical microscopy (SECM) was employed for corrosion studies of carbon steel, stainless steel and aluminum alloy in a neutral chloride solution. The SECM Au tips at nano-scale size were prepared by laser-assisted pulling method and characterized by scanning electron microscope (SEM) and electrochemical method. In the SECM test, the  $\Gamma/I_3^-$  redox couple was used as a mediator for mapping the temporal and spatial evolutions of tip current on each metallic substrate with or without a scratched nanocomposite coating. The results reveal that it is appropriate to combine the generation-collection (G-C) mode of SECM with the feedback current mode in order to elucidate the possible reaction mechanism and pathways underlying the localized corrosion of the three metals investigated.

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**Keywords:** Stainless steel; carbon steel; aluminum alloy; localized corrosion; scanning electrochemical microscope (SECM)

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