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Synthesis of disruptive technologies and innovations in nano-materials for economizing oil & gas operations

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Ultrafine grained (UFG) and bulk nano-crystalline (NC) alloys possess unique properties of high-strength, corrosion-resistance, making them ideal candidates for applications in demanding conditions, for example deployment in sour-hostile reservoirs. Conflicting data on mechanism(s) and corrosion behavior of nanomaterials have been published because of several factors, primarily due to limitations of experiments conducted in aggressive (high pressure and temperature (HPHT) caustic) environments. Here we present, our know-how around a large number of novel fabrication and processing techniques with controlled supply chain to tailor multi-functional properties of materials by manipulating

materials microstructure at atomic scales to achieve combination of strength, ductility, fracture-toughness, corrosion resistance, among other properties with a focus on accelerated corrosion or dissolvability. Our lecture will encompass experiments exposing nano-materials to HPHT conditions to demystify conundrums current in literary domains. As concluding remarks, we will reflect on (a) our capabilities to synthesize disruptive technologies across industries, to increase the throughput of engineering operations, the basis of our competitive advantage (b) integrating nano-materials into areas of upstream oil and gas to economize.

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