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Ultra-thin graphene coating: The novel nanotechnology for remarkable corrosion resistance

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Abstract

Monolayer or a few atomic layer thick graphene coatings on metals have been shown to improve their corrosion resistance by nearly orders of magnitude. Though there are very few studies reported on the topic of corrosion resistance due to graphene coating, there is still considerable variability in the degree of improvement. For example, improvement in aqueous corrosion resistance of copper due to graphene coating is reported to vary from insignificant to nearly 2 orders of magnitude, whereas the improvement for nickel can be in excess of an order of magnitude. This presentation will review the most recent research on graphene that has been claimed as 'the thinnest known corrosion-protecting coating', and examine the potential application of such disruptive approach to corrosion resistance of common engineering alloys such as mild steels.

Biography

Raman Singh has a joint position at Dept of Mechanical & Aerospace Engineering and Dept of Chemical Engineering. He is also a Research Professor at Center for Clean Energy Engineering (C2E2), Univ of Connecticut, USA. He has established new research activities and labs in his areas of his expertise. He has supervised 25 Ph.D.'s. His vibrant research group comprises Ph.D. students from different disciplines (Mechanical, Chemical, Materials and Mining Engineering and Science) as well as from different cultural backgrounds (Australian, Chinese, Sub-continent, African, North America, Malaysia, Israel). His professional distinctions and recognitions include: editor of a book on cracking of welds, member the editorial/review boards of a few journals (including the prestigious, Metallurgical & Materials Transactions of ASM, USA), leader/co-chairman of a few international conferences and regular keynote/invited lectures at international conferences, over 135 peer-reviewed international journal publications, 15 book chapters/books and over 100 reviewed conference publications, and several competitive research grants totaling over $8M (that includes 3 Discovery, and 8 Linkage grants of Australian Research Council).