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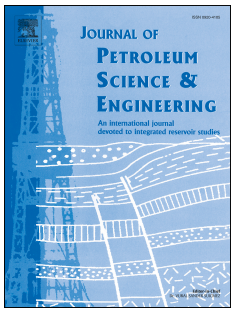

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Graphene: A Review of Applications in the Petroleum Industry

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Abstract:

Graphene, in its pure or derivative form has been a topic of increasing importance in the scientific community for many years. However, its application in the oil and gas industry has only been popularized in the last few years, with the bulk of research taking place within the last ten years or less. Due to graphene's unique chemical, structural, electrical, and mechanical properties, it shows applicability for many areas within the oil and gas industry. Areas of application include drilling, lubrication, desalination, anti-corrosion coatings, cementing, oil-water separation, oil spill cleanup, and emulsion stabilization to name a few. This paper reviews graphene and its derivatives as they apply to the oil and gas industry and describes how this revolutionary substance will have impacts on the technology of the industry for years to come. The main factor preventing immediate implementation into the industry is not scientific, but rather economic and industrial. Scaling up laboratory results to a size that is applicable to the oil and gas industry in a cost efficient manner will prove to be the largest obstacle moving forward.

Keywords: drilling fluids, cementing, rheology, fluid loss control, shale stability, oil spill cleanup, anti-corrosion.

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