

## Nanofluid based on Zinc Oxide/Ferric Oxide Nanocomposite as Additive for Geothermal Drilling Fluids

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**Abstract :** Corrosion resistance and lubrication are crucial characteristics required for geothermal drilling fluids. In this study, a ZnO/Fe<sub>2</sub>O<sub>3</sub> nanocomposite was fabricated and incorporated into the structure of Cetyltrimethylammonium bromide (CTAB). Several physicochemical techniques were utilized to analyze and describe the synthesized nanomaterials. The surface morphology of the composite was assessed through scanning electron microscopy (SEM) and energy-dispersive X-ray spectroscopy (EDAX). The corrosion inhibition capabilities of these materials were explored across various corrosive environments. The weight loss and electrochemical methods were utilized to determine the corrosion inhibition activity of the prepared nanomaterials. The results demonstrate a high level of protection achieved by the composite. Additionally, the lubricant coefficient and extreme pressure properties were evaluated.

**Keywords :** nanofluid, corrosion, geothermal drilling fluids, ZnO/Fe<sub>2</sub>O<sub>3</sub>

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