

# GREEN SYNTHESIS OF IRON OXIDE NANORODS FROM DECIDUOUS OMANI MANGO TREE LEAVES FOR HEAVY OIL VISCOSITY TREATMENT

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**G**reen synthesis of iron oxide nanorods were achieved by utilizing rich polyphenols in Omani mango tree leaves as a reducing agent. The obtained Iron (III) oxide nanorods (IONRs) were  $(15 \pm 2)$  nm in average length and  $(3.0 \pm 0.2)$  nm in average diameter. These nanorods were polycrystalline in structure with different diffraction planes indicating the presence of a specific type of IONRs which are alpha phase, hematite ( $\alpha$ -Fe<sub>2</sub>O<sub>3</sub>) and gamma phase, maghemite ( $\gamma$ -Fe<sub>2</sub>O<sub>3</sub>). The relatively smaller size, distribution, and heat conversion make the obtained nanorods a good candidate for heavy crude oil cracking process. Direct microwave radiation causes a reduction in dynamic viscosity of crude oil due to the presence of dipole water molecules. The viscosity reduction rate was found to be higher when impregnated IONRs nanorods were placed within the heavy oil. The viscosity was reduced by 10% when 0.2 g of IONRs was added to 1 L of heavy oil at T = 30 °C. This reduction increased up to 38% and 49% when 0.4 and 0.6 g/L additives were added respectively at the same temperature. However, when 0.8 g of IONRs is added to the heavy oil no noticeable change in the viscosity was found, indicating the oils' additive saturation point

## Biography

Majid Salim Al-Ruqeishi is a Researcher in graphene and nanomaterials fabrication field at physics department, faculty of science, Sultan Qaboos University. He holds a bachelor in science education (physics) from the Sultan Qaboos University, Sultanate of Oman, 2001 and a Master Degree in applied physics (Radiation and Plasma) from University of Malaya, Malaysia, August 2006. He acquired his PhD with full fellowship and a minimum completion period certificate in solid state physics (Nanotechnology) from the same university, August 2010. He worked as a Scientific Researcher in Science division of Oman National Commission for Education, Culture and Science, MOE, 2010-2012. Moving to Sultan Qaboos University inspired him to build nanofabrication and grapheme lab with his colleagues where he supervised more than 30 final year students' projects in the field of nanomaterial synthesis and development of innovative applications in various energy fields. He published more than 25 peer reviewed journal articles, 19 as a main author. He takes keen interest in synthesizing nanomaterials and graphene by physical and chemical methods especially chemical vapor deposition technique (CVD) and to develop smart Nano-based solutions for various energy issues. Most recently, he received best researcher award in Sultan Qaboos University for the year 2015-2016, during the University day, 2ed May 2016. In addition, he was selected the best oral research presenter in the 4th international conference in nanoscience and nanotechnology, Kuala Lumpur, Malaysia, Jan 2016. Finally, he awarded a Arab-American Frontiers Fellowship by US National Academy of Sciences (NAS) to start collaborative research with graphene research group at mechanical engineering, University of Illinois at Urbana-Champaign (UIUC), Illinois, Jan 2017.

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