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**Physicochemical studies on the desulfurization process of organosulfur compounds occur in crude oil by metallo-complexation method**

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**Abstract**

All over the world researchers in accelerating to development the new and modern methods of desulfurization process to overcome the presence of residual sulfur compounds in the crude oil, which has harmful effects and undesirable. Out of these important research aims to use various copper(II) salts as catalysts to break the bond between the carbon and sulfur in thiourea compound as one of the initial organic compounds containing the sulfur element, which is present in many of the organic compounds present in crude oil. In literature survey at room temperature the chemical reactions between thiourea and different copper(II) salts give copper(II) complex with octahedral geometry and molecular formula as  $[\text{Cu}(\text{NH}_2\text{CSNH}_2)_6]\text{X}_2$  where  $\text{X} = \text{Cl}^-$ ,  $\text{Br}^-$ ,  $\text{CH}_3\text{COO}^-$ ,  $\text{NO}_3^-$ ,  $\text{SO}_4^{2-}$ . The novelty of our study is precipitated yellow sulfur element and black copper(II) sulfide at elevated temperature  $\sim 90^\circ\text{C}$  through the molar ratio 1:6 ( $\text{Cu}^{++}$ : thiourea) in aqueous media. The infrared spectra of the resulted precipitated product clearly indicate the absence of bands due to thiourea. The scanning electron microscopy (SEM) and X-ray energy dispersive spectrometer (EDX) are scanned to check the morphological surfaces and the basic elements constituting the reaction products. A chemical mechanisms discussing the formation of sulfur and copper(II) sulfide are suggested.

**Keywords:** Desulfurization; infrared spectra; copper(II) ions; thiourea; SEM; EDX.

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