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Please fill in your manuscript title.	Development and Application of Pseudo Ionic Liquid Sulfur Removal Agent Containing Nitrogen Heterocyclic in the South China Sea	
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Abstract

In the South China Sea oil field, the reservoir buried depth is large and the temperature is high. Also, the secondary H₂S concentration increases gradually with only short processing flow. For conventional triazine sulfur removal agent, the sulfur removal capacity in high absorption state is limited and remains precipitation generation, it cannot meet the demand of sulfur removal in this oilfield and the economical efficiency is low.

A new economic solvent-based desulfurizer with high adsorption rate of sulfur, fast sulfur removal efficiency and environmental friendly trait has been developed. Pseudo ionic liquid sulfur removal agent HCZ-01 was synthesized including a nitrogenous heterocyclic compound as electron donor, a polyorganic amine as electron acceptor, emulsifier and polyol as solvent additives. "One pot method" was used to synthesize the agent in alkaline condition with temperature of 50~70 °C. This agent can realize physical and chemical cooperative absorption with high adsorption rate of sulfur and high sulfur removal efficiency.

The effects of ventilation components, gas-liquid ratio, dosing method, reaction temperature and reaction pressure on sulfur removal effect were evaluated in the laboratory. The results showed that under the conditions of hydrogen sulfide content of 20000ppm, gas-liquid ratio of 100:40, reaction time of 15min and reaction temperature below 70°C, the sulfur removal efficiency of the desulfurizer was higher than 98%. Due to the characteristics of pseudo ionic liquid, there is no precipitation in high absorption state, and the agent could inject into pipeline process directly which greatly simplified the surface facilities. The pseudo ionic liquid sulfur removal agent HCZ-01 has been applied to treated production liquid of 40 wells in 5 blocks in South China Sea oil field. Compared with previous conventional triazine desulfurizer, HCZ-01 has a better application effect and the sulfur removal rate is increased by 10% under the same concentration of agent. There is no waste liquid and gas produced in the agent synthesis process, and no precipitation and scale formation in reaction product after added to the production process, the pipeline and equipment are double protected.

At present, the study on H₂S absorption and separation by pseudo ionic liquids is in initial stage. For the first time, pseudo ionic liquid sulfur removal agent with triazine as the electron acceptor was synthesized with extremely high sulfur removal capacity. Due to the efficient synthesis process and property of pseudo ionic liquid, the production cost of chemicals and human force has been significantly reduced.