Oxidative-Extractive Deep Desulfurization of Gasoline by Functionalized Heteropoly Acid Catalyst

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1. Synthesis of heteropoly acid catalyst
2. Optimization of reaction conditions for O₂ ECODS
3. Optimization of reaction conditions for H₂Ο₂ ECODS
4. IR spectra of the heteropoly blue 3
1. Synthesis of heteropoly acid catalyst

![Fig. 1 The color change for the synthesis of heteropoly acid catalyst](image)

2. Optimization of reaction conditions for O$_2$ ECODS

For O$_2$ ECODS system, the selected optimum conditions are as follows: the heteropoly blue (n=148, m=4.0 g), P(O$_2$)=1.0 MPa, T=105 °C and t=2 h. Under the optimum conditions, the desulfurization rate can reach 85%.

![Fig. 2 Influence of the amount of the heteropoly blue on the desulfurization rate](image)
Fig. 3 Influence of oxygen pressure on the desulfurization rate

Fig. 4 Influence of reaction temperature on the desulfurization rate

Fig. 5 Influence of reaction time on the desulfurization rate
3. Optimization of reaction conditions for H$_2$O$_2$ ECODS

For H$_2$O$_2$ ECODS system, the selected optimal reaction conditions are as follows: the heteropoly blue 3 (n=108, m=1.5 g), V(H$_2$O$_2$, 30 wt%)=50 μL, T=45 °C and t=20 min. Under the above conditions, the sulfur compound of BT can be completely removed.

![Fig. 6 Influence of the amount of the heteropoly blue on the desulfurization rate](image1)

![Fig. 7 Influence of the amount of H$_2$O$_2$ on the desulfurization rate](image2)
Fig. 8 Influence of reaction temperature on the desulfurization rate

Fig. 9 Influence of reaction time on the desulfurization rate
4. IR spectra of the heteropoly blue 3

Fig. 10 IR spectra of the heteropoly blue 3 (the curve a: fresh; the curve b: the regenerated after OEDS)