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 O_2 ECODS

3. Optimization of reaction conditions for H_2O_2 ECODS

4. IR spectra of the heteropoly blue 3

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1. Synthesis of heteropoly acid catalyst

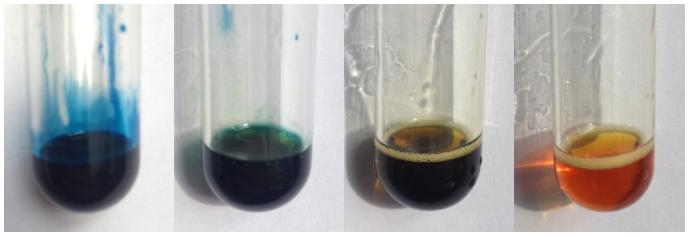

Fig. 1 The color change for the synthesis of heteropoly acid catalyst

2. Optimization of reaction conditions for O_2 ECODS

For O_2 ECODS system, the selected optimum conditions are as follows: the heteropoly blue **3** (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%.

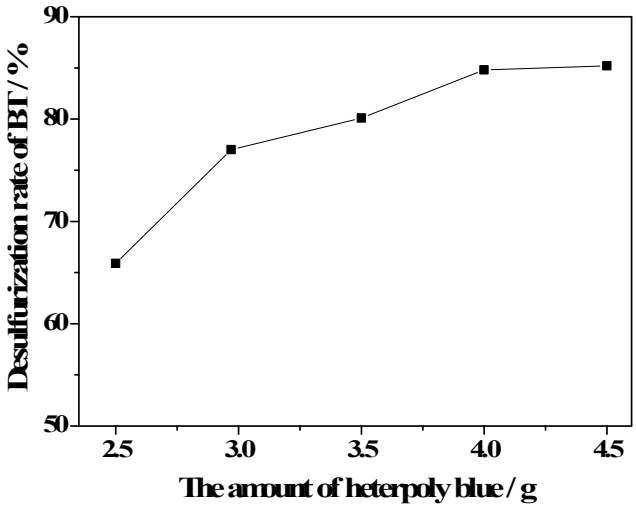

Fig. 2 Influence of the amount of the heteropoly blue on the desulfurization rate

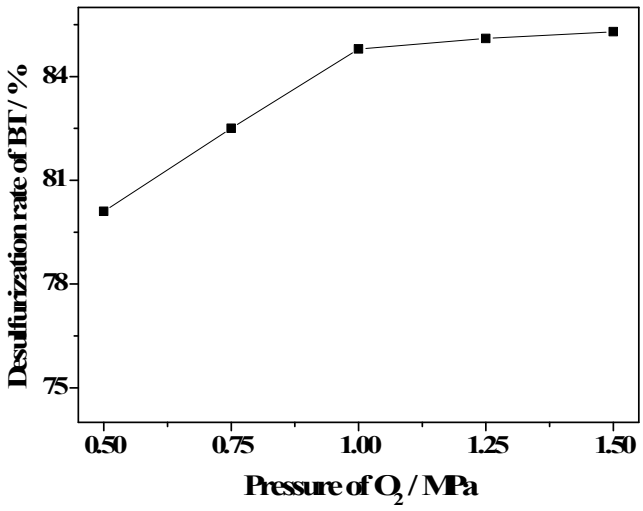

Fig. 3 Influence of oxygen pressure on the desulfurization rate

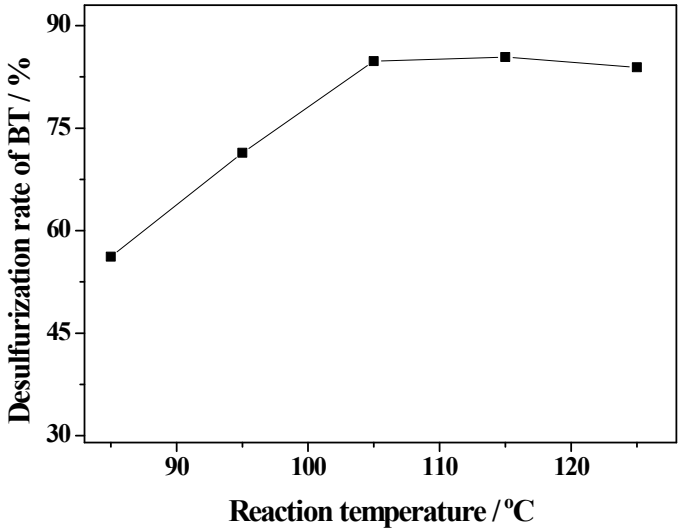

Fig. 4 Influence of reaction temperature on the desulfurization rate

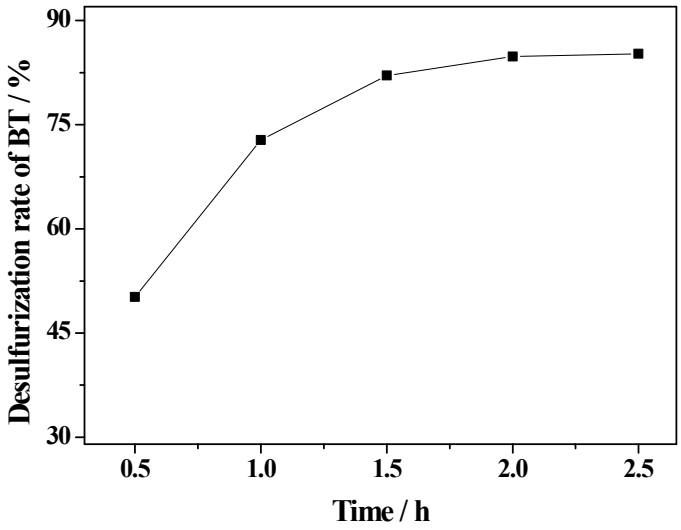

Fig. 5 Influence of reaction time on the desulfurization rate

3. Optimization of reaction conditions for H_2O_2 ECODS

For H_2O_2 ECODS system, the selected optimal reaction conditions are as follows: the heteropoly blue **3** (n=108, m=1.5 g), V(H_2O_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.

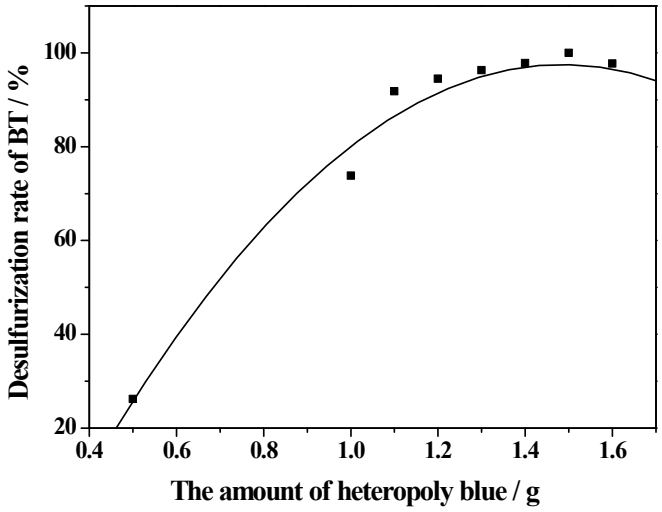

Fig. 6 Influence of the amount of the heteropoly blue on the desulfurization rate

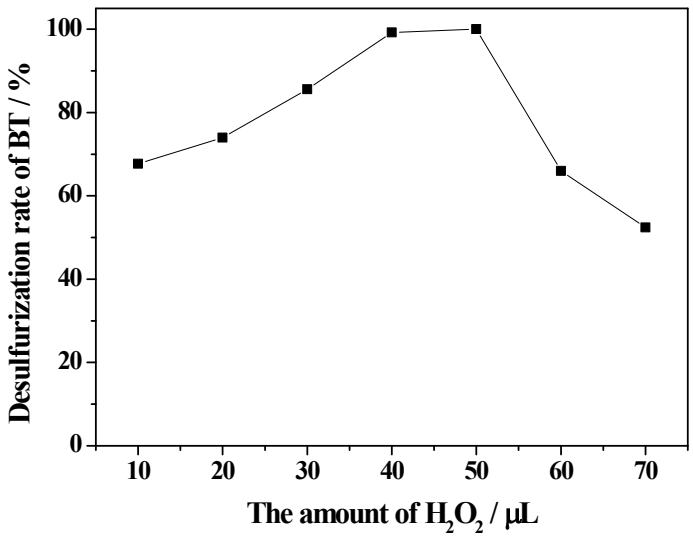

Fig. 7 Influence of the amount of H_2O_2 on the desulfurization rate

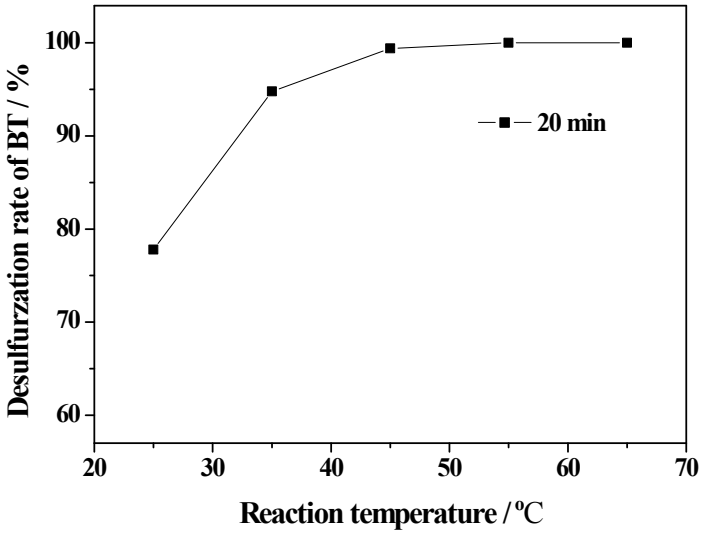

Fig. 8 Influence of reaction temperature on the desulfurization rate

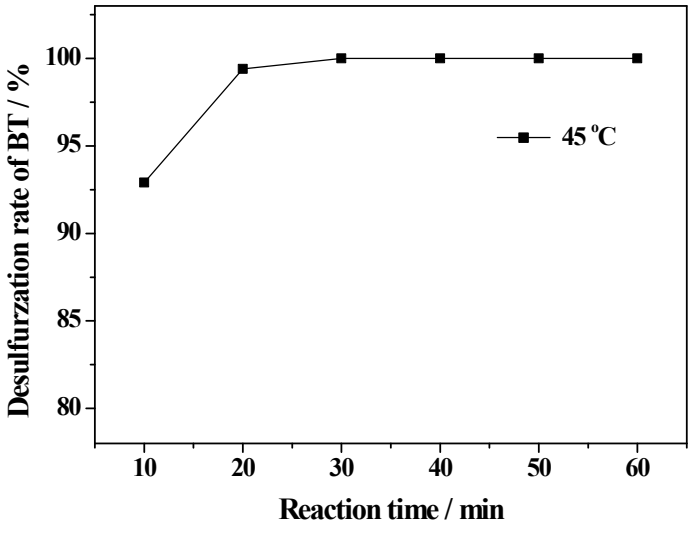

Fig. 9 Influence of reaction time on the desulfurization rate

4. IR spectra of the heteropoly blue 3

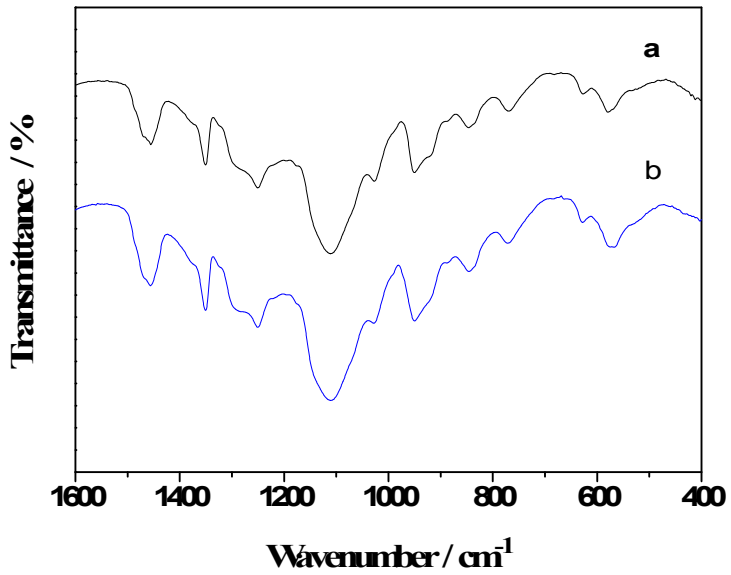

Fig. 10 IR spectra of the heteropoly blue **3** (the curve a: fresh; the curve b: the regenerated after OEDS)