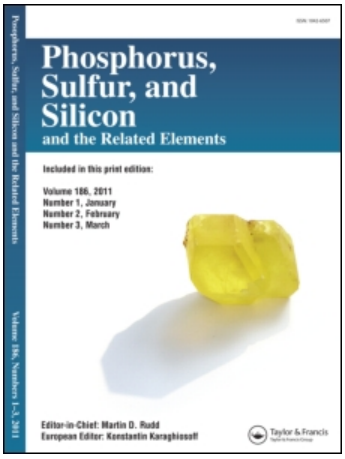

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Alkyl Polysulfides as Presulfiding Agents of a $CoMo/Al_2O_3$ Catalyst: Effect on Catalytic Properties

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ALKYL POLYSULFIDES AS PRESULFIDING AGENTS OF A $CoMo/Al_2O_3$ CATALYST : EFFECT ON CATALYTIC PROPERTIES

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Abstract Presulfiding a $CoMo/Al_2O_3$ catalyst with *t*-nonyl or *t*-dodecyl pentasulfides improved both activities for thiophene hydrodesulfurization and cyclohexene hydrogenation.

INTRODUCTION

The sulfidation of Co and Mo oxides supported on Al_2O_3 is conventionally achieved in the reactor with a H_2S/H_2 mixture. In a novel procedure[1,2], the oxidic catalyst is first impregnated with an organic polysulfide $R\text{-}S_n\text{-}R$, then treated at 130°C.

CATALYTIC ACTIVITIES

Figure 1 shows typical product distributions versus space time for thiophene (A) and cyclohexene (B) model reactions at 280°C and 4 MPa, together with the corresponding kinetic networks. Rate constants were used to quantify two functions of the sulfided catalyst : hydrogenation was evaluated by k_{T1} or k_C (thiolane or cyclohexane formation), and C-S bond rupture ability by k_{T2}.

Results are summarized in Table I. The conventionally sulfided catalyst appeared selective towards hydrogenation. Presulfiding with *t*-nonyl or

t-dodecyl pentasulfides improved hydrogenation by about 30 % and C-S bond breaking by about 80 %.

The improvement is ascribed to the sulfidation of the metal oxides at low temperature, which is initiated by the decomposition products of the polysulfides during the presulfiding step.

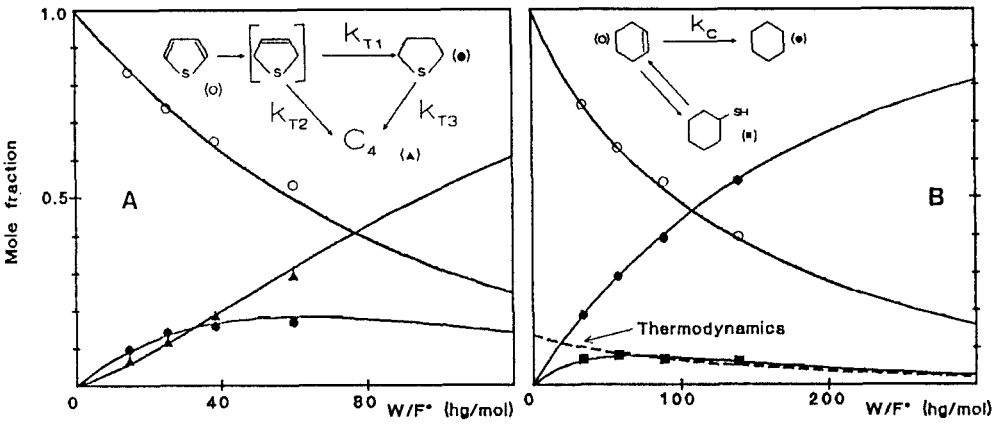

Figure 1 Product distribution and simplified reaction scheme for thiophene (A) and cyclohexene (B) at 280°C and 4 MPa.

TABLE I Rate constants (l/hg) for thiophene and cyclohexene reactions on $CoMo/Al_2O_3$ catalysts sulfided with H_2S/H_2.

Presulfiding agent	Thiophene		Cyclohexene
	k_{T1}	k_{T2}	k_C
none	51	15	84
t-C_9-S_5-*t*-C_9	65	25	104
t-C_{12}-S_5-*t*-C_{12}	60	31	114

ACKNOWLEDGEMENT

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1. G. Berrebi, U.S. Pat. 4 530 917, July 23, 1985.
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