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**SILICA-ALUMINA SUPPORTED CATALYSTS IN
HYDRODESULFURIZATION OF 4,6-DIMETHYLDIBENZOTHIOPHENE
AND HYDRODESULFURIZATION OF 1-BENZOTHIOPHENE PARALLEL
WITH HYDRODEOXYGENATION OF OCTANOIC ACID**

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Mesoporous silica-aluminas (MSA) containing 2–25 wt.% Al₂O₃ were studied as supports of Pd-Pt (0.10–1.50 wt.%) and CoMo (16.3 wt.%) catalysts and were compared with reference commercial catalyst CoMo/Al₂O₃. Transformation of 4,6-dimethyldibenzothiophene (4,6-DMDBT) was evaluated both on the MSA supports and Pd-Pt/MSA catalysts in a flow reactor in the gas phase at 300°C and 5.0 MPa. CoMo catalysts were compared in hydrodesulfurization (HDS) of 1-benzothiophene (BT) parallel with hydrodeoxygenation (HDO) of octanoic acid (OA) at 330°C and 1.6 MPa using first order rate of ethylbenzene and hydrocarbons (heptane+octane) formation k_{EB} and k_{HC} as activity indexes, respectively. It was found that isomerization and disproportionation of 4,6-DMDBT occur on MSA supports. Brønsted acidity and the amount of deposited active metal phase influenced the overall HDS activity k_{DMDBT} and HYD/cracking selectivity. HDS on Pd-Pt catalysts proceeded almost exclusively by the hydrogenation (HYD) route. Activities of majority of Pd-Pt catalysts correlated with their Brønsted acidities while not with metal dispersion¹. The studied sulfidic CoMo phase increased DDS route (formation of DMBP) and results in similar HDS/HDO activity and selectivity (k_{EB}/k_{HC}) as the reference Al₂O₃ supported counterpart. We believe that high acidity of MSAs positively influence hydrotreatment of 4,6-DMDBT and oxygen (OA) containing feeds, which motivate our forthcoming research.

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Table 1. Activity of catalysts in HDS of 4,6-DMDBT and HDS/HDO of BT/OA.

Catalyst	W/F _{DMDBT} g.h/mol	X _{DMDBT}	k _{DMDBT} mmol/h.gcat	W/F _{BT} g.h/mol	k _{EB} mmol/h.gcat	k _{HC} mmol/h.gcat
0.10PdPt/MSA2	168	0.70	7.1	-	-	-
0.32PdPt/MSA2	130	0.92	19.3	-	-	-
0.82PdPt/MSA2	110	0.91	21.7	-	-	-
1.23PdPt/MSA2	103	0.91	23.2	-	-	-
0.11PdPt/MSA4	166	0.82	10.2	-	-	-
0.31PdPt/MSA9	128	0.87	15.8	-	-	-
0.74PdPt/MSA13	149	0.88	14.1	-	-	-
1.32PdPt/MSA13	75	0.90	30.3	-	-	-
1.50PdPt/MSA13	80	0.84	22.3	-	-	-
ref. 11.6CoMo/Al ₂ O ₃	1182	0.83	1.5	-	-	-
16.3CoMo/MSA25	-	-	-	10	106	21
ref. 12.9CoMo/Al ₂ O ₃	-	-	-	10	97	30

Reference:

¹ Vít Z., Gulková D., Kaluža L., Kupčík J. Applied Catalysis B: Environmental, **2015**, 179, 44-53.