

## SUPPORTING INFORMATION

### “Facile ambient pressure propylene carbonate solution synthesis of highly divided CoMoS solids.”

Santiago Palencia-Ruiz <sup>a</sup>, Dorothee Laurenti <sup>a</sup>, Denis Uzio <sup>b</sup>, Christelle Legens <sup>b</sup>, Pavel Afanasiev\*<sup>a</sup>

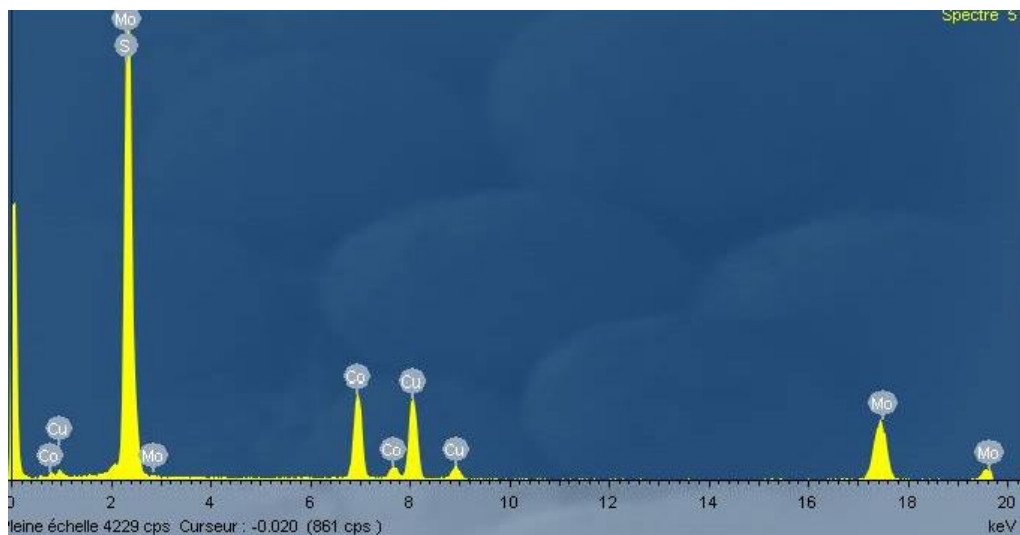
<sup>a</sup> Univ Lyon, Université Claude Bernard Lyon 1, CNRS, IRCELYON, F-69626, Villeurbanne, France.

<sup>b</sup> IFP Energies Nouvelles, Rond-point de l'échangeur de Solaize, BP 3, F-69360 Solaize, France.

**Table S1 Properties of CoMoS-x solids, initial (after solution reaction and drying) and activated at different conditions.**

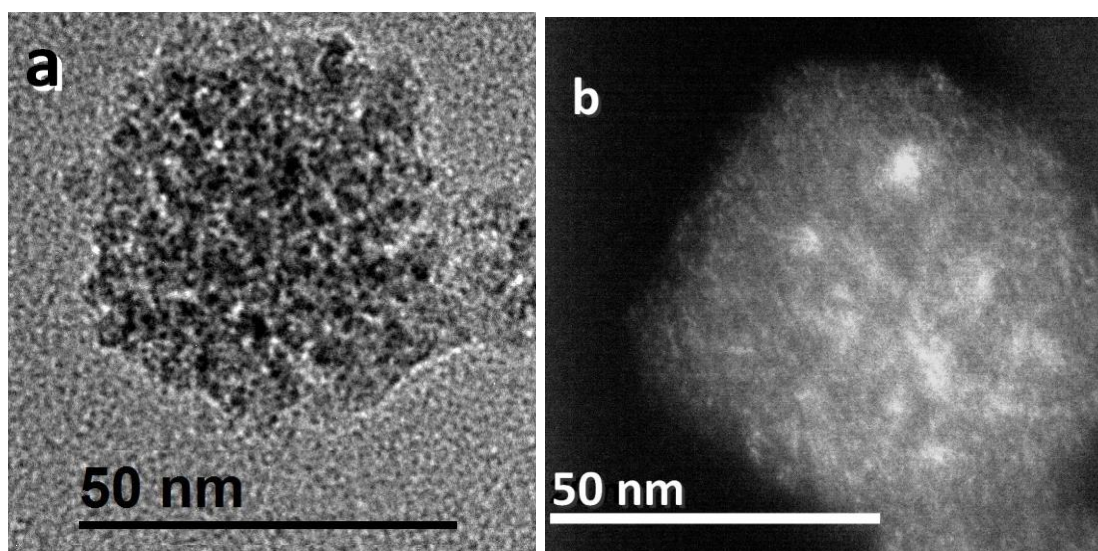
Material	Treatment conditions	Composition, EDS <sup>a</sup>	S BET; m <sup>2</sup> /g
CoMoS-1	Initial dried	MoCo <sub>0.53</sub> S <sub>3.84</sub>	Nd <sup>b</sup>
CoMoS-1	400 °C H <sub>2</sub> S/H <sub>2</sub> , 1h	MoCo <sub>0.58</sub> S <sub>2.32</sub>	132
CoMoS-1	400 °C H <sub>2</sub> , 1h	MoCo <sub>0.55</sub> S <sub>2.29</sub>	140
CoMoS-1	400 °C N <sub>2</sub> , 1h	MoCo <sub>0.52</sub> S <sub>2.44</sub>	105
CoMoS-2	Initial dried	MoCo <sub>0.51</sub> S <sub>3.99</sub>	Nd
CoMoS-2	400 °C H <sub>2</sub> S/H <sub>2</sub> , 1h	MoCo <sub>0.50</sub> S <sub>2.48</sub>	127
CoMoS-3	Initial dried	MoCo <sub>0.55</sub> S <sub>5.84</sub> <sup>c</sup>	Nd
CoMoS-3	400 °C H <sub>2</sub> S/H <sub>2</sub> , 1h	MoCo <sub>0.53</sub> S <sub>2.57</sub>	44

<sup>a</sup> accuracy of EDS chemical composition analysis in our case was not high, about 15 %, because of overlap between Mo L and S K signals; <sup>b</sup> BET surface area of the initial dried samples could not be measured because outgassing in vacuum under increased temperature was impossible; <sup>c</sup> anomalously high sulfur content for this sample is probably due to residual elemental sulfur remained because of incomplete washing.



Elément	Pic	Surface	k	Abs	%Masse	%Masse	%Atomique
	Surface	Sigma	facteur	Correct.		Sigma	
S K	37041	1012	0.552	1.000	30.54	0.62	51.39
Co K	13041	204	0.728	0.995	14.11	0.24	12.92
Cu K	13349	204	0.803	0.995	15.92	0.27	13.51
Mo K	15096	254	1.761	0.994	39.44	0.54	22.18
Totaux					100.00		

**Fig S1 EDS spectrum of CoMoS-1 activated in H<sub>2</sub>S/H<sub>2</sub> flow at 400 °C and the elemental analysis report. Cu is present because of Cu grid sample holder.**



**Fig. S2 (a) TEM image of CoS<sub>2</sub> obtained from sole Co precursor reaction in PEC at 240 °C; (b) Dark field TEM image of CoMoS-3 sample taken at the (200) diffraction spot of CoS<sub>2</sub> phase. It can be concluded that Co seed as depicted in the image (a) is covered with several nm layer of MoS<sub>x</sub>.**