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Atomic insights into hydrodesulfurization

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Curriculum Vitae

Mahesh Krishna Prabhu was born in Kochi, Kerala, India in March 1991. He completed his schooling from Kendriya Vidyalaya No. 1, Kalpakkam in the year 2008. Thereafter, he pursued a Bachelor degree in chemical engineering at the National Institute of technology, Trichy, India. He continued his studies further through a Master of Science degree in chemical engineering with a chemical product engineering specialization at the Technical University of Delft. During his master thesis project, he worked on developing atomic layer deposition processes for fabricating air-stable quantum dot films for optoelectronic applications in the groups of Dr. Arjan Houtepen and Prof. Dr. Ruud van Ommen. After his graduation, he continued his research in the group of Dr. Ranjani Vishwanatha at the Jawaharlal Nehru center for Advanced Scientific Research, India. Here, he developed an integrated liquid-phase atomic layer deposition process for synthesizing titanium dioxide-iron pyrite quantum dot films for heavy metal-free photovoltaic devices. Thereafter, he started his Ph.D. project in the Catalysis and Surface Chemistry group at Leiden University with Dr. Irene Groot as his co-promotor and prof. Dr. Marc Koper as the promotor. Most of the work carried out by him during this period is described in this thesis. After his Ph.D. defense, Mahesh Krishna Prabhu will pursue his academic research as a post doc in the group of Dr. Irene Groot at Leiden University.

List of publications

Peer-reviewed publications

1. David Valdesueiro*, Mahesh K. Prabhu*, Carlos Guerra-Nunez, C. S. Suchand Sandeep, Sachin Kinge, Laurens D. A. Siebbeles, Louis C. P. M. de Smet, Gabrie M. H. Meesters, Michiel T. Kreutzer, Arjan J. Houtepen, and J. Ruud van Ommen, Deposition Mechanism of Aluminum Oxide on Quantum Dot Films at Atmospheric Pressure and Room Temperature, *J. Phys. Chem. C* 2016, 120, 8, 4266–4275.
2. Mahesh K. Prabhu*, Dajo Boden*, Marcel J. Rost, Jörg Meyer and Irene M. N. Groot, Structural Characterization of a Novel Two-Dimensional Material: Cobalt Sulfide Sheets on Au(111), *J. Phys. Chem. Lett.* 2020, 11, 21, 9038–9044
3. Mahesh K. Prabhu and Irene M. N. Groot, Low-Temperature Synthesis Strategy for MoS₂ Slabs Supported on TiO₂(110), *Surfaces* 2020, 3(4), 605-621
4. Mahesh K. Prabhu and Irene M. N. Groot, Simultaneous sulfidation of Mo and Co oxides supported on Au(111), *Phys. Chem. Chem. Phys.*, 2021, 23, 8403-8412
5. Mahesh K. Prabhu and Irene M. N. Groot, Synthesis Strategy for Co-promoted MoS₂ Slabs Supported on TiO₂(110) (*manuscript under preparation*)
6. Mahesh K. Prabhu*, Dajo Boden*, Marcel J. Rost, Jörg Meyer and Irene M. N. Groot, Application of the DAS model for the structural characterization of TMDCs (*manuscript under preparation*)
7. Mahesh K. Prabhu, Jaap N. Louwen and Irene M. N. Groot, Structural characterization of the Co-substituted S edge of a CoMoS nanocluster:

Substrate effects on the 1D metallic edge states (*manuscript under preparation*)

8. Mahesh K. Prabhu, Jaap N. Louwen and Irene M. N. Groot, In situ observation of hydrodesulfurization on a Co-promoted MoS₂ model HDS catalyst at industrially relevant conditions (*manuscript under preparation*)
9. Mahesh K. Prabhu, Jaap N. Louwen and Irene M. N. Groot, Stability of the Co-substituted S edges of CoMoS nanoclusters under HDS conditions (*manuscript under preparation*)
10. Mahesh K. Prabhu and Irene M. N. Groot, Effect of hydrogen on the sulfidation of Co and Mo nanoparticles : A ReactorSTM study (*manuscript under preparation*)

* Authors have contributed equally to the work