



van der Waals Heterostructures for Innovative PhotoCATalysts

Fact Sheet

Project Information

WHIPCAT

Grant agreement ID: 750929

[Project website](#) 

DOI

[10.3030/750929](https://doi.org/10.3030/750929) 

Project closed

EC signature date

28 March 2017

Start date

1 September 2017

End date

31 August 2019

Funded under

EXCELLENT SCIENCE - Marie Skłodowska-Curie Actions

Total cost

€ 183 454,80

EU contribution

€ 183 454,80

Coordinated by

THE UNIVERSITY OF
BIRMINGHAM

 United Kingdom

Objective

Engineering of atomic (two-dimensional (2D)) layered solids is receiving immense attention from the scientific community due to the possibilities of tuning the optical, mechanical, electronic and electrochemical properties by combinatorial stacking of different atomic layers as novel candidates for energy and environmental applications. Van der Waals solids (vdW) of Semiconducting Transition Metal Dichalcogenides (STMD) have been largely investigating 2D materials, where its physico-chemical properties show a drastic contrast in comparison to its bulk. Visible light absorption, indirect to direct bandgap transition, layer dependent photoluminescence (PL) etc. are some of the stark contrasts in atomically layered

STMD vdW crystals from bulk, making them unique for photocatalysis and photo-(electro) catalysis (PEC) applications. In this work, Fabrication of variety of novel heterogeneous STMD clusters with combinations of different transition metal (TM): Mo, W and V and chalcogenide (C): S, Se and Te by cluster beam deposition will be carried out for the efficient visible light photocatalysis and PEC applications. Size and edge termination dependent photophysical properties will be investigated and further implemented for the efficient visible light PEC from this kind of vdW solids. A dual-target, magnetron-sputtering gas condensation cluster source will be used to deposit pristine combinatorial stacked nanoclusters of TMs and Cs onto various substrates. The photocatalytic reaction kinetics will be estimated from the visible light absorption, Raman/PL spectroscopy and photoconductivity studies. Further PEC activity towards HER/oxygen reduction reaction (ORR)/oxygen evolution reaction (OER) from the STMD vdW nanoclusters will be evaluated from linear sweep voltammetry and cyclic voltammetry in acidic and basic electrolytes in dark and light conditions.

Fields of science (EuroSciVoc)

[natural sciences](#) > [chemical sciences](#) > [catalysis](#) > **[photocatalysis](#)**

[natural sciences](#) > [chemical sciences](#) > [inorganic chemistry](#) > **[transition metals](#)**

[natural sciences](#) > [earth and related environmental sciences](#) > [environmental sciences](#) > **[pollution](#)**

[natural sciences](#) > [physical sciences](#) > [electromagnetism and electronics](#) > **[semiconductivity](#)**

[natural sciences](#) > [physical sciences](#) > [optics](#) > **[spectroscopy](#)**



Programme(s)

[H2020-EU.1.3. - EXCELLENT SCIENCE - Marie Skłodowska-Curie Actions](#)

MAIN PROGRAMME

[H2020-EU.1.3.2. - Nurturing excellence by means of cross-border and cross-sector mobility](#)

Topic(s)

[MSCA-IF-2016 - Individual Fellowships](#)

Call for proposal

[H2020-MSCA-IF-2016](#)

[See other projects for this call](#)

Funding Scheme

[MSCA-IF-EF-ST - Standard EF](#)

Coordinator



THE UNIVERSITY OF BIRMINGHAM

Net EU contribution

€ 183 454,80

Total cost

€ 183 454,80

Address

Edgbaston

B15 2TT Birmingham

 **United Kingdom** 

Region

West Midlands (England) > West Midlands > Birmingham

Activity type

Higher or Secondary Education Establishments

Links

[Contact the organisation](#)  [Website](#) 

[Participation in EU R&I programmes](#) 

[HORIZON collaboration network](#) 

Last update: 16 August 2022

Permalink: <https://cordis.europa.eu/project/id/750929>

European Union, 2025