



Alessandro Cataldo

ABOUT ME

I am a recently graduated **master student** in **Materials Engineering and Nanotechnology** in **Politecnico di Milano** looking forward to a **new challenge**. During my master thesis at Consiglio Nazionale delle Ricerche - Institute for Microelectronics and Microsystems, I worked on 2D materials, focusing on the growth of MoS₂ and its Raman characterization, matching my personal and academic interest in electronics. I am very **proactive, ambitious, independent** and **organised** and I am searching for new opportunities to learn and apply my skills.

WORK EXPERIENCE

Stage

Consiglio Nazionale delle Ricerche - Institute for Microelectronics and Microsystems [2022 – 2023]

Effects of precursor chemistry in few-layers MoS₂ from AP-CVD sulphurisation. The work focused on reporting a method for the synthesis of large-area (~ cm²) few-layers MoS₂ via liquid precursor CVD, where the ammonium heptamolybdate (AHM) Mo precursor is provided via solution spin-coating. In particular, we focused on the effect of different inorganic seed promoters (NaOH, KCl and KI) on the thickness, morphology, uniformity and degree of coverage of the grown MoS₂ by using visible Raman spectroscopy and Scanning Electron Microscopy (SEM) as main characterization techniques.

EDUCATION AND TRAINING

Master Degree

Politecnico di Milano [01/03/2020 – 08/05/2023]

Address: Piazza Leonardo da Vinci, 32, 20133 Milan (Italy)

Website: www.polimi.it

Field(s) of study: Materials Engineering and Nanotechnology

Final grade: 108/110

Thesis: Effects of precursor chemistry in few-layers MoS₂ from AP-CVD sulphurisation

Bachelor Degree

Politecnico di Milano [01/09/2015 – 05/03/2020]

Address: Piazza Leonardo da Vinci, 32, 20133 Milan (Italy)

Website: www.polimi.it

Field(s) of study: Materials Engineering and Nanotechnology

Final grade: 90/110

Thesis: Sintesi di rGO/SnO₂ e formulazione di inchiostri per future applicazioni di sensoristica

Diploma di Liceo Scientifico Tradizionale

Liceo Scientifico Marie Curie [2010 – 2015]

Address: Via E. Cialdini, 181, Meda (Italy)

PUBLICATIONS

Impact of Cvd Chemistry on Band Alignment at the MoS₂/SiO₂ Interface

[2023]

Solid State Electronics (SSE)

P. P. Tummala, G. Delie, **A. Cataldo**, S. Ghomi, C. Martella, G. Ferrini, A. Molle, A. Lamperti, Valeri Afanas'ev

Reliable knowledge of energy alignment of electronic bands at interfaces of few layered Molybdenum Disulfide (MoS_2) is crucial for designing MoS_2 based electronic devices. In this work, we have applied internal photoemission spectroscopy (IPE) to characterize this band alignment. MoS_2 films grown on $\text{SiO}_2(50\text{nm})/\text{Si}$ using two different methods have been analyzed by IPE to determine the energy position of the semiconductor valence band (VB) relative to the reference level of the insulator conduction band (CB). We found that changing the MoS_2 growth method from Vapor Phase Reaction (VPR) of MoO_3 and sulfur, to Solid Precursor Film (SPF) of sulfurized AHM- NaOH spin coated MoS_2 film, results in significant (≈ 600 meV) enhancement in the electron barrier. Such effects are ascribed to the interaction of hydroxy groups from NaOH and AHM promoters with the SiO_2 surface leading to interface dipole modification.

CONFERENCES AND SEMINARS

Role of precursors chemistry on the growth and band alignment of few-layers MoS_2 from liquid chemical vapor deposition

[Paestum (SA), 10/2023]

NMDC 2023 - Nanotechnology Materials and Devices Conference

P.P. Tummala, **A. Cataldo**, S. Ghomi, C. Massetti, C. Martella, G. Ferrini, A. Molle, V. Afanas'ev, A. Lamperti

Impact of chemistry on the interface with substrate of MoS_2 nanosheets grown by ambient pressure chemical vapor deposition

[Napoli, 08/2023]

ICCGE 20 - International Conference on Crystal Growth and Epitaxy

A. Lamperti , P.P. Tummala, G. Delie, **A. Cataldo**, S. Ghomi, C.S. Casari , G. Ferrini, V. Afanas'ev, C. Martella, A. Molle

Impact of Cvd Chemistry on Band Alignment at the $\text{MoS}_2/\text{SiO}_2$ Interface

[Pizzo (VV), 06/2023]

INFOS 2023 - 23rd Conference on Insulating Films and Semiconductors

P. P. Tummala, G. Delie, **A. Cataldo**, S. Ghomi, C. Martella, G. Ferrini, A. Molle, A. Lamperti, Valeri Afanas'ev

TECHNICAL SKILLS

Technical skills

Advanced knowledge of **Office Package**, in particular **Word**, **Excel** and **PowerPoint**.

Technical software:

- **Origin**, from handling of raw data to graph plots and data extrapolation.
- **Autodesk Inventor**, skill acquired during an university course.
- **Matlab**, basic programming knowledge.

During my master thesis stage I learned to work with two **chemical vapour deposition machines (CVDs)**.

Regarding characterization techniques, I extensively worked on **Raman Spectroscopy**-