

**Recent advances in the liquid precursors chemical vapor deposition (CVD)
of MoS₂ on SiO₂ and on GaN**

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Atomically thin molybdenum disulfide (MoS₂) is a two-dimensional (2D) semiconductor with versatile applications, thanks to its peculiar properties: direct bandgap, high carrier mobility, strong light-matter interaction. A topic of active research is the integration of this 2D material with bulk wide-bandgap semiconductors such as Gallium Nitride, to combine the functional properties of 2D layers with the well-assessed electronic quality of semiconductor substrates. Chemical Vapour Deposition (CVD) is a reliable method to prepare Monolayers (ML) of MoS₂: the recent adoption of liquid molybdenum precursors allows to have reproducible wafer-scale synthesis of such structures. I will first present the fundamental features of the CVD growth of 2D MoS₂ assisted by metal liquid precursors on SiO₂/Si substrates. Then, I will show how the MoS₂/GaN heterostructure can be prepared: i) by direct CVD growth on GaN and ii) by mechanical transfer of MoS₂ on GaN surfaces. Fundamental properties of these structures, based on characterization data, will be presented. Finally, some conclusions on strengths and weaknesses of both approaches will be drawn. Authors acknowledge the support of MUR under the PRIN project "2DIntegratE" (2022RHRZN2).