

## Licentiate Seminar

# Liquid exfoliation of molybdenum disulfide for inkjet printing

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## Abstract

Since the discovery of graphene, much efforts have been made in the synthesis and production of 2D materials. Industrial scalable methods to produce high quality exfoliated nanosheets have been a great challenge. One of the most promising methods to achieve this is through liquid based exfoliation.

To date the best solvents to disperse and stabilize nanosheets without additives such as surfactants, were organic solvents but considering the low throughput achieved, the use of organic solvents may not be viable economically and also not environmental friendly. We discuss in this thesis the use of water as a solvent to exfoliate molybdenum disulfide ( $\text{MoS}_2$ ), a layered material like graphene but with the difference of being a semiconductor with a large band gap, especially if exfoliated into a monolayer. The study of such 2D material is fundamental for applications such as transistors where graphene cannot be employed unless a bandgap is introduced into the material by costly engineering methods. The method here described could be easily employed to exfoliate other 2D materials as well, and it consist of two exfoliation steps one in the bulk powder using sand papers and the other in the liquid dispersion using probe sonication. Read the whole abstract on the website [www.miun.se/fscn](http://www.miun.se/fscn).



**External Reviewer:** Docent Li Yang

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