PÔSTER - RESUMO - DISPOSITIVOS ELETRÔNICOS, ELETROQUÍMICOS, SUPERCAPACITORES E BATERIAS

LOW-COST LIQUID-PHASE EXFOLIATION OF MOLYBDENUM DISULFIDE (MOS2) FOR DEVICE APPLICATIONS

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Globally, the demand for novel materials for advanced technological application has increased significantly. In this regard, two-dimensional materials (2DMs), such as graphene and molybdenum disulfide (MoS2), have emerged as versatile platforms owing to their unique physico-chemical properties. However, the scalable production of high-quality, few-layer dispersion for thin-film applications remains a challenge, particularly regarding process simplicity, cost-effectiveness and environmental safety. Liquid phase exfoliation (LPE) represents a promising strategy for formulating 2DM-inks. LPE depends on the interplay between the bulk precursor, the solvent, and the applied force to overcome Van der Waals forces and prevent reaggregation of the nanosheets. While various techniques such as ultrasound-induced LPE (UILPE), high-shear mixing (HSM), microfluidization, and electrochemical exfoliation (EE) offer

distinct advantages, they also presents trade-offs. For instance, UILPE typically yields thinner and smaller nanosheets, but commonly results in structural defects. Conversely, HSM produces larger, thicker flakes while offering a highly scalable system. Consequently, this project aims to establish a robust platform for producing exfoliated MoS2 inks, specially investigating HSM parameters, solvents interactions, and blade geometries.

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