2D Nanomaterials for Electronics and Energy Storage

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Abstract

Innovative and high-quality nanomaterials are critical in accelerating 2D research for energy and electronics applications. Through academic collaborations and internal R&D, we have developed graphene oxides, graphene derivatives, and 2D nanomaterials including MXenes, and germanane. MXenes, a family of two-dimensional (2D) transition-metal carbides, nitrides, and carbonitrides comprise a broad field of diverse and highly tunable materials. The combination of MXenes unique properties, such as their 2D layered structure, high electrical conductivity (~24000 S/cm), and reactive surface chemistry, make them very exciting for many applications. In collaboration, we have developed processes to provide these 2D nanomaterials formulated into well-characterized, ready-to-use dispersions containing few-layered MXene, graphene, exfoliated hexagonal boron nitride, or transition metal dichalcogenides. However, issues remain, particularly in regard to these nanomaterials stability. In this presentation we will be sharing the results of preliminary studies of the stability of well-dispersed 2D materials. Further, as part of our commitment to sustainability in organic electronics, we are developing formulations of 2D nanomaterials in our novel ElectroGreen™ solvents.

Figures

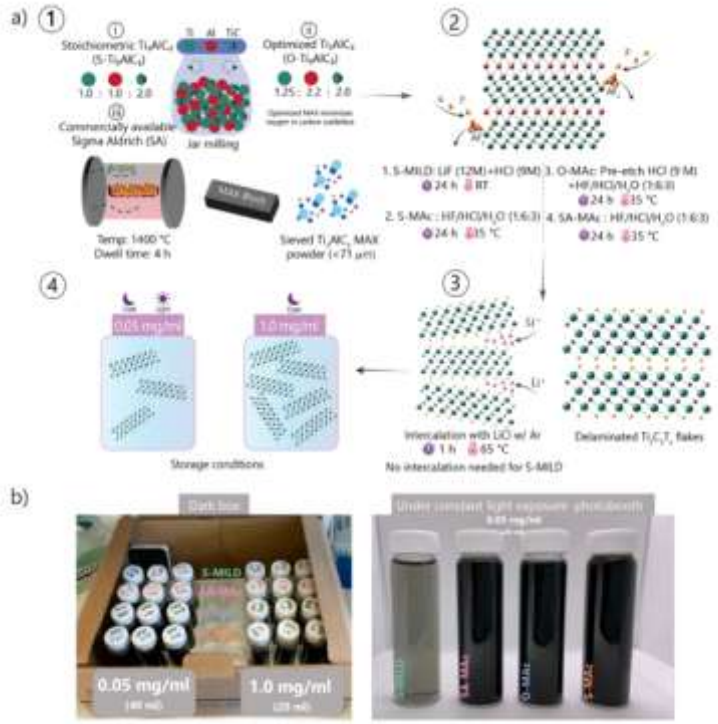

Figure 1: Experimental setup of MXene photostability studies