



CYCLE DE CONFÉRENCES DE CHIMIE

*Avec le concours de : Université Clermont Auvergne
SIGMA Clermont*

Jeudi 20 juin à 16 h

Amphi Rémi (site des Cézeaux)

Aimin YU

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Synthesis and Application of 2D Materials

Two-dimensional (2D) materials are crystalline materials consisting of a single layer of atoms. Due to their unique structures and properties, they have attracted considerable interests in recent years.

In the first section of the talk, I will introduce our recent work on the preparation of graphene nanocomposites and films. For the preparation of graphene composites, the graphene surface is firstly modified with polydopamine via an in-situ polymerization process which provides an ideal interface for the in situ growth of other functional nanomaterials on graphene with various morphology and functionalities. The application of these graphene composites are given on areas such as electrocatalysis, biosensing, and Raman SERS. The section then introduces the preparation of nanostructured graphene composite films with the aid of thermally curable surfactant and layer-by-layer self-assembly technique.

In the second section, we report the exfoliation of boron nitride nanosheets (BNNS) in a hydroxide assisted aqueous media with the aid of sonication. The resulting BNNS possessed abundant hydroxyl groups which enable the in-situ growth of uniform Ag, Au and Pt nanoparticles on BNNS, without the presence of any reductant. In another application, an ultrathin high thermal conductive heat spreader was fabricated by pure hydroxylated BNNS for the first time. The in plane thermal conductivity of pure BNNS heat spreader could reach 58.3 W/mK after a simple low temperature annealing process for de-hydroxylation. This novel BNNS heat spreader possessed excellent thermal stability which would find promising applications as an effective heat transfer in electrical devices operating under high temperature condition.

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