

Highly dispersion of Pristine Graphene in organic solvents and its catalyst support application

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Highly concentrated suspension of graphene holds a very important role for scalable chemistries to enable processing and fabrication. We report a new method to synthesis of highly dispersion of pristine graphene in organic solvents (NMP, THF, DMF), directly from expandable graphite. NMP, THF, DMF are investigated as suitable solvents to disperse pristine graphene due to the familiar of their dispersive, polar, and hydrogen bonding Hansen parameters with graphene. Hence, NMP was chosen as the solvent to disperse Pt nanoparticles with diameter in range of 2.5–5nm on pristine graphene sheets which improved electrocatalytic activities and stabilities for electro-oxidation. Furthermore, the dried Pt- pristine graphene composite exhibits a BET surface area value as high as over 20 times in comparison of dried graphene. The Pt nanoparticles act as spacers resulting in mechanically exfoliated, high surface area nanomaterial. The resulting highly expanded pristine graphene-Pt composite with a high specific surface area is promising for battery, supercapacitors, and fuel cells applications.