**Platelet-like Structured 2-D Carbon: Solution-phase Preparation and Application for Thermal and Electrochemical Energy Storage**

**Balaji Padya 1, 2, \***

International Advanced Research Centre for Powder Metallurgy and New Materials (ARCI), Hyderabad, India.

*\*balaji@arci.res.in*

**Ravi Kali1, N. Narasaiah2, P.K. Jain1**

1International Advanced Research Centre for Powder Metallurgy and New Materials (ARCI), Hyderabad, India.

2National Institute of Technology (NIT), Warangal, India.

**ABSTRACT**

To mitigate the environmental issues and to restrict the dependency on conventional fossil fuels, the popularity on use of renewable sources gained tremendous interest to develop sustainable energy storage devices with suppressed thermal runaway. In a category of advanced materials, the 2D carbon allotrope, graphene has attracted immense interest owing to its exceptional thermal, mechanical, chemical, electrical and electronic characteristics.

In the present investigation, few-layer graphene platelet (FLGP) with high aspect ratio was prepared through mixed-solvent assisted exfoliation and applied for energy storage in electrochemical and thermal energy storage. The activation-assisted modified FLGP exhibited specific capacitance of 253 F/g at 1 A/g with exceptionally good rate capability in non-aqueous electrolyte applied in Li-ion capacitor. FLGP-loaded myristic acid based solid-liquid phase change materials were prepared with various (0.5, 1 and 3 wt. %) loading. The influence of FLGP loading on thermal conductivity, melting and freezing temperatures and latent heat were studied.

*Keywords: Graphene Platelet, Thermal conductivity, Li-ion capacitor, Thermal energy storage*