

# Development of Nano-Sized Graphene Flowers as Neutron Reflectors – Structural Control of Nano-Sized Graphene and Application as Neutron Reflectors

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In order to enhance the intensity of neutron beams, attention has been focused on the coherent scattering caused by nano-sized particle aggregations, and the use of nanodiamonds has been actively considered. Graphene, which has a sp<sup>2</sup> carbon crystal structure, has a large van der Waals force compared to sp<sup>3</sup> carbon crystal structure such as nanodiamond, and the bonding force between carbon atoms is also strong, so it is expected to be easy to mold into a desired shape and to adapt to higher radiation fields. On the other hand, graphene is prone to agglomeration due to its large van der Waals force, and it has been difficult to form a nano-sized three-dimensional structure. To solve this problem, we focused on the hot isostatic pressing (HIP) method, which uses resin powder as a raw material and produces vapor-grown graphene by HIP. In this presentation, we will report on a method for preparing a graphene flower structure in which nano-sized graphene is three-dimensionally and free-standing, a method for controlling the nano-size of graphene, and the prototype of a graphene neutron reflector.

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