

Abstract Submitted
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Using plasmas to control the nucleation, morphology and properties of self-organized graphene nanosheets SHAILESH KUMAR, CSIRO CMSE, DONG HAN SEO, The University of Sydney, KOSTYA (KEN) OSTRIKOV, CSIRO CMSE, PLASMA NANOSCIENCE CENTRE AUSTRALIA (PNCA) TEAM — Low temperature non-equilibrium plasma-assisted nanofabrication technique has a great potential for the controllability of nucleation density and complex morphology of various advanced nanomaterials, some of the nanostructures such as vertical vertical graphene nanosheets (GNSSs) can be produced only in a plasma environment. The plasma-assisted control of nucleation and morphology of vertical GNSSs on a catalyst-free substrate have been studied. The plasma-generated electric field was observed to be crucial for the synthesis of self-assembled vertical GNSSs on the undulating surface of the substrate. The process provides the fundamental understanding of the mechanisms for the control over the number density, length and the degree of arrays alignment of the nanosheet by a simple variation of plasma parameters. It was demonstrated the control of degree of graphitization of GNSSs, which enables to tune its electrical resistivity properties from dielectric to semiconducting and metallic, is possible.

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