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Graphene originated 3D structures grown on the assembled nickel particles TEREZA PARONYAN, AVETIK HARUTYUNYAN, Honda Research Institute USA Inc., HONDA RESEARCH INSTITUTE USA INC. TEAM — Recently, the fabrication of various morphologies of graphene originated structures became very important due to the perspective of wide range of new applications. Particularly, free standing 3D structured graphene foams could be imperative in energy related areas. Here, we present the new approach of the CVD growth of 3D graphene network by using primarily sintered Ni particle's ($\sim$40μm size) assembles as a template-catalyst via decomposition of low rate of CH_4 at 1100° C based on synthesis method described earlier [1]. SEM and Raman spectra analysis revealed the formation of graphene structure containing a single up to few layers grown on the sintered metal particles served as a catalyst-template. After etching the metal frame without using any support polymer, 3D free-standing graphene microporous structure was formed demonstrating high BET surface area. Two probe measurements of frame resistance were $\sim$2-8Ω. Our approach allows controllable tune the pore size and thereby the surface area of 3D graphene network through the variation of the template-catalyst particles size.

[1]. T. M. Paronyan et al. ACS Nano, **5**, p. 9619 (2011)

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