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Simultaneous synthesis of single-layer and multi-layer graphene

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Single-layer graphene (SLG) and multi-layer graphene (MLG) are synthesized in single batch using vacuum-assisted chemical vapor deposition (VA-CVD) process. Copper foil substrate is used as catalyst for SLG synthesis and nickel foil substrate is used as catalyst for MLG synthesis. Substrates are placed in VA-CVD reactor tube, copper substrate positioned as first and nickel as second relative to gas inlet port. Substrates are annealed in hydrogen atmosphere at 1273 K for 60 minutes. Methane gas is used as carbon atom source with growth time of 30 minutes. Cooling rate is critical variable in MLG synthesis-flash cooling resulted in no MLG deposits while cooling rates of 5 K/minute resulted in good MLG deposits. Raman spectrums of SLG samples indicate low concentration of defects and thickness of one graphene layer. Raman spectrum of MLG indicate medium to high concentration of defects and multiple graphene layers. This method can substantially reduce amount of manhours if one needs to synthesize both SLG and MLG.

Biography

Zoran Eres has completed his MSc from Faculty of Electrical Engineering and Computing. He is working as an Expert Advisor at Rudjer Boskovic Institute, Zagreb, Croatia. He is currently a PhD student. He is the author of 1 patent, 9 conference papers and 10 official studies. He was Leader of project "High temperature cell for optical measurements in corrosive atmosphere" completed in 2015.

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