

Bottom-up fabrication of graphene nanoribbon array field effect transistor using perpendicular lamellar pattern of block copolymer

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Precise spatial control over the electrical properties of thin films is the key capability enabling the production of modern integrated circuitry. So we have to find another building block as insulator and combine these two building blocks into one circuit. On the other hand, uniform edge of graphene is important factor for electronic devices. Recently, some groups reported that graphene nanoribbon array field-effect transistor using top-down method like lithography. However, this graphene nanoribbon array field-effect transistor have not uniform edges of graphene due to using lithography. Here, we report one step growth of graphene/amorphous carbon(G/AC) hetero-structures from solid source as polystyrene-b-polymethylmetacrylate (PS-b-PMMA) lamellar pattern via UV irradiation. Our results represent an important step towards developing 2D integrated circuitry and enable the fabrication of electrically isolated active and passive elements embedded in continuous sheet.