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Spatially Selective Graphene Formation on Si Substrate[1] NAILI YUE, YONG ZHANG[2], RAPHAEL TSU, UNC-Charlotte — A uniform large area graphene is useful for applications such as electrode in a touch screen or substrate for growing another material. For applications where graphene is used either as active material (FET for instance) or electrode in a 2-D device array, to form a 2D (electronic) superlattice or photonic crystal, it is critically important to be able to form graphene at selective locations, in desirable size and shape on a substrate, without relying on mechanical cutting. It would be even more significant if the substrate is a Si wafer for coupling with the mature microelectronic technology. We have developed a technique that can achieve these goals. A thin SiC film is first deposited on a Si substrate using MBE. Then, at ambient condition, a focused laser beam is used to convert SiC to graphene at the selected location with the shape and size that can be defined by either a lithographic method or simply by a focused laser beam. The graphene conversion has been verified by structural characterization (TEM, SEM/EDS, etc.) and Raman spectroscopy.

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