Damage-free dry etching processing of SiC substrates by using high-pressure plasma

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Abstract

Silicon carbide (SiC) is a semiconductor material employed in manufacturing graphene, nanodevices, photonics materials, and so on.SiC substrates require perfect crystal quality and smooth surfaces to make them high quality. When SiC substrates are processed using mechanical processing methods, damaged layers are generated. It is difficult to remove these by conventional wet etching owing to their chemical inertness. To remove the damaged layers, we suggested plasma etching using high-pressure plasma; accordingly, we achieved damage-free surfaces with a high removal rate of more than 15 μm/min, and smooth surfaces with a surface roughness of 1.71 nm (root mean square value).

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