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Deposition of a Stable and High Concentration of Carboxylic Acid Functional Groups onto a Silicon Surface via a Tailored Remote Atmospheric Pressure Plasma Process

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Abstract

Processes to introduce carboxylic acid functional groups onto surfaces have been widely applied in various applications, such as molecular grafting for biosensors, biocompatibility improvement, gas filter/adsorption in environmental engineering and the enhancement of interfacial adhesion between fillers (such as carbon or glass fibre) and matrices (such as epoxy resin) in composite materials. To develop an environmental-friendly process to introduce a stable and high concentration of carboxylic acid functional groups, Acrylic Acid (AAc) was deposited onto silicon wafers using remote argon atmospheric plasma processing (APP) and vapour phase grafting in a bespoke Pyrex cylindrical chamber. The chamber stands vertically with