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Gold ion implantation into alumina using an “inverted ion source” configuration

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ABSTRACT

We describe an approach to ion implantation in which the plasma and its electronics are held at ground potential and the ion beam is injected into a space held at high negative potential, allowing considerable savings both economically and technologically. We used an “inverted ion implanter” of this kind to carry out implantation of gold into alumina, with Au ion energy 40 keV and dose (3–9) × 10^{16} cm^{-2}. Resistivity was measured *in situ* as a function of dose and compared with predictions of a model based on percolation theory, in which electron transport in the composite is explained by conduction through a random resistor network formed by Au nanoparticles. Excellent agreement is found between the experimental results and the theory.

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