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New way for synthesis of porous silicon using ion implantation

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Abstract

A novel idea to create a porous silicon layers by low-energy high-dose metal-ion implantation was realized. To demonstrate a possibility for this technique Ag-ion implantation into monocrystalline silicone substrate was provided. Silicon plates were implanted at energy 30 keV with doses of 7.5 × 1016 - 1.5 × 1017 ion/cm2 at room temperature. Surface porous structures were analyzed by scanning electron microscope images and energy-dispersive X-ray data. It is shown that the average sizes of porous are increasing approximately from 70 to 120 μm with an increasing of ion doses. The formation of silver nanoparticles inside porous silicon walls was also observed. Novel developed technology based on ion implantation is suggested to give a new way for using of porous layer structures combined with the silicon matrix for various applications.

Keywords

Ion implantation, Porous silicon, Silver nanoparticles