

Bipolar hipims for filling silicon trenches and porous substrate

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The bipolar HiPIMS (high-power impulse magnetron sputtering) technology has been recently developed for tailoring ions energies in thin film deposition. The effects of a positive pulse following the negative HiPIMS pulse have been intensively studied using energy-resolved mass spectrometry whereas few papers deal with the effect of this pulse on the properties of hard coatings. In this study, we investigated its effect on the filling of silicon trenches and on the penetration inside porous substrate (silicon), the filling and the penetration being characterized by scanning electron microscopy and Rutherford backscattering spectroscopy. We correlated these results to the time integrated (and time resolved) ion energy distribution obtained by an energy-resolved mass spectrometry and by a retarding field energy analyzer, to the energy influx incoming onto the substrate measured by a thermal probe.