

Abstract Submitted
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SiH₄ and SiF₄ dissociation in MDECR plasmas and consequences for material properties SAMIR KASOUIT, Total Gas & Power, 2 Place Jean Millier, 92078 Paris La Défense Cedex, France, PAVEL BULKIN, LAURENT KROELY, PERE ROCA I CABARROCAS, LPICM, Ecole Polytechnique, 91128 Palaiseau Cedex, France — Depositing at higher rates and on larger areas are important objectives for the reduction of thin film silicon modules costs. High deposition rates have been obtained using different plasma sources but uniformity over large areas is still problematic. Matrix distributed electron cyclotron resonance (MDECR) systems consist of individual plasma sources, which could be arranged in arrays with virtually no size limitations. Deposition rate of silicon alloys, exceeding 10 nm/s, has been demonstrated, but little is known so far about the precursors' dissociation and species fluxes onto the surface. We study here the dissociation of SiH₄ and SiF₄, and its dependence on the process parameters such as the power density and pressure. SiH₄ is found to be completely depleted within a wide range of powers and pressures, and no gas phase polymerization is observed. This leads to high deposition rates from species such as atomic Si. Such behavior is compared to SiF₄ mixtures, and correlated to the properties of the deposited material.

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