

## Growth of SiO<sub>2</sub> Thin Films by Plasma-Assisted Reactive Magnetron Sputtering under the Impingement of Positive and Negative Ions

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Growth of amorphous SiO<sub>2</sub> thin films deposited by reactive magnetron sputtering [1] has been studied under different oxygen partial pressures at low temperatures. Film microstructures varied from coalescent vertical column-like [2] to compact microstructures, possessing all of them similar refractive indexes. A discussion on the process responsible for the different microstructures is carried out, focusing on the influence of i) surface shadowing mechanism [3], ii) positive ion impingement on the film, and iii) negative ion impingement [4]. We conclude that only the latter can be responsible for the obtained microstructural changes, and, in particular, the impingement of O<sup>-</sup> ions with kinetic energies between 20 and 200 eV. Overall, it is also demonstrated that there are two microstructuring regimes in the growth of amorphous SiO<sub>2</sub> thin films by magnetron sputtering at low temperatures, which stem from the competition between surface shadowing and ion-induced adatom surface mobility.

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