PÔSTER - RESUMO - MATERIAIS E BIOMATERIAIS

ENHANCING STABILITY AND REDUCING ANNEALING TEMPERATURE OF CSPBI3 FILMS THROUGH CONTROLLED SOLUTION AGING AND HI INCORPORATION

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The CsPbI3 perovskite has been widely studied for photovoltaic applications due to its excellent optoelectronic properties, such as a favorable bandgap, high carrier mobility, and high absorption coefficient. However, its application faces synthesis and stability challenges, requiring temperatures above 300 °C for the crystallization of the photoactive black phase, and presenting unwanted transitions to the yellow phase during cooling. In this work, the use of hydroiodic acid (HI) as an additive was investigated to mitigate these issues, alongside a study on the precursor solution aging process and the existence of an optimization window for the produced films [1–3]. The incorporation of HI, by inducing lattice strain, enabled a reduction in the annealing temperature to 100 °C, in addition to improving film stability. Comparatively, the films processed with HI maintained optical properties similar to those of samples produced in a controlled atmosphere without HI addition, presenting a bandgap of 1.75 eV, consistent with the literature. Additionally, the study of precursor solution aging revealed an optimization window, UV-Vis spectroscopy showed that the

precursor solution aged for 7 days results in films that preserved their absorption patterns even 4 days after deposition. Scanning Electron Microscopy (SEM) images corroborated this result, evidencing that aging favors the formation of larger grains and reduces porosity. It is concluded, therefore, that controlling the aging time and using HI are effective strategies to obtain CsPbI3 films with superior properties and stability.

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Palavras-chave: perovskite; cspbi3; stability; precursor solution.