

Abstract Submitted  
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**Low-pressure positive column discharges in zinc and zinc halides**

DAVID SMITH, GE Global Research — Zn-containing discharges were investigated by means of spectroscopic measurements of a capacitively-coupled discharge. Under optimum conditions (2 Torr Ar, 10-40 mW cm<sup>-3</sup>), the Zn positive column converts electrical power into zinc atomic radiation with an efficiency of >50%. This value is comparable to the efficiency of a Hg positive column discharge, and does not strongly depend on whether the Zn was introduced as pure metal, or as zinc iodine or zinc bromide, a somewhat surprising result given the additional non-radiative power deposition mechanisms that are available in a plasma that contains molecules. A novel diagnostic based on analysis of selected emission line ratios was used to estimate densities of the ground state and excited states of Zn as a function of lamp wall temperature, and to better understand the important processes in these molecular plasmas.

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