

Abstract Submitted
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Mercury-free alternatives for HID lamps RALF METHLING, STEFFEN FRANKE, HELMUT HESS, HARTMUT SCHNEIDENBACH, HEINZ SCHÖPP, INP Greifswald, Germany, LOTHAR HITZSCHKE, MARKO KÄNING, BERNHARD SCHALK, OSRAM GmbH, Munich, Germany — Lighting consumes about 20% of the world-wide electrical energy. The development of energy-efficient environmentally friendly lamps proves to be a major task of sustainability research. Up to now most of the highly efficient plasma lamps depend on the unique properties of mercury, which are the high vapor pressure and the large electron momentum-transfer cross section. The replacement of mercury became a challenge and motivation for the development of new high-intensity discharge lamps (HID lamps) in recent years. We introduce a mercury-free high-pressure discharge lamp in quartz technology and compare it with a corresponding mercury-containing lamp. It will be shown that the favorable properties of mercury are provided in a large extent by a combination of Xe and AlI₃. The atomic and molecular radiation caused by the admixture of TII and TmI₃ dominates the spectral radiance. For this mercury-free high-pressure discharge a high luminous efficacy of more than 90 lm/W and a good color rendering index of more than 75 are achieved.

Ralf Methling
INP Greifswald, Germany

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