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Determination of Ba-emitter densities along electrodes in high pressure sodium lamps by optical absorption spectroscopy MICHAEL WESTERMEIER, JENS REINELT, PETER AWAKOWICZ, JUER-GEN MENTEL, Ruhr-University of Bochum, Germany — Nowadays, high pressure sodium lamps gain more importance in various fields of lighting e.g. for horticulture lighting. To achieve a long lifetime, a detailed understanding of the density of the barium emitter around the lamp electrodes and its interaction with them is needed. The lamp under investigation has a special research design. It is downscaled to a 140 W lamp and equipped with a sapphire discharge tube to allow optical observations. Ba is stored in a tungsten coil around the rod shaped tungsten electrodes and transported to the tip during operation. By measuring the absorption of the 553 nm Ba resonance line the spatially resolved Ba density around the electrodes during lamp operation is determined. As backlight a filtered UHP-lamp is installed. The measuring results show a decrease of Ba along the electrode axis representing a diffusion process. Further results will be shown for different lamp operating parameters (e.g. current, frequency) and combined with the measured electrode temperature profiles.

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