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Simultaneous detection of optogalvanic and fluorescence signals in a uranium hollow-cathode lamp

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Abstract

Detection of laser-induced fluorescence simultaneously with an optogalvanic signal in a hollow-cathode discharge provides information about the laser–atom interaction that leads to the optogalvanic effect, resulting in a better comprehension of its spectroscopic applications. Because of the high density of levels in heavy atoms, multiphoton transitions can easily occur and complicate the interpretation of saturation effects. The representative case of the 5915-Å uranium transition is reported.

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Mark A. Nippoldt and Robert B. Green
Appl. Opt. **20**(18) 3206-3210 (1981)

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Several atomic emission sources were investigated for their potential to induce optogalvanic signals in hollow cathode lamps. The sources included an inductively coupled argon plasma, a H(2)-O(2) flame, a high-temperature furnace, electrodeless micro. Very low level optogalvanic signals were observed from the other sources but could not be unambiguously ascribed to emission from a specific element. A problem encountered was the presence of a background signal due to photoelectric emission and possibly radiative heating of the cathode. Authors: C T Apel; R A Keller; E F Zalewski; R Engleman. Related Documents We describe a simple method for the observation of argon ion transitions in hollow-cathode lamps, using the optogalvanic effect, and report the first optogalvanic detection of the six ArII transitions: 457.9 nm, 476.5 nm, 488.0 nm, 496.5 nm, 501.7 nm and 514.5 nm. We also study the optogalvanic signal as a function of the incident laser power and the lamp current. PACS 35.80. Atomic and molecular measurement and techniques. PACS 07.65.Eh. Visible and ultraviolet spectroscopy and spectrometers. Partial financial support of CNPq and FINEP (Brazil). This is a preview of subscription content, log Very low level optogalvanic signals were observed from the other sources but could not be unambiguously ascribed to emission from a specific element. A problem encountered was the presence of a background signal due to photoelectric emission and possibly radiative heating of the cathode. 1. Introduction element. 1 the OGS induced in a uranium hollow cath- ode detector filled with neon is shown as a function of the discharge current in the uranium source hollow cathode filled with argon (commercial hollow cathode The authors are with University of California, Los Alamos National tubes were used). 3. 2 An argon-filled hollow cathode lamp could be used as an argon emission

-I- to stabilize the argon plasma torch.