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A Pb_2CrO_5 Thin Film Ultraviolet-Sensitive Device

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A solid-state ultraviolet (UV)-sensitive photodetector which uses a Pb_2CrO_5 thin film evaporated on a glass substrate by an electron-beam evaporation technique is described. The UV sensitivity is dependent on the annealing temperature of the films. A favorable spectral response is obtained under the UV radiation in sunlight. The sensitivity in the mid- and near-ultraviolet region (200–400 nm) is larger than that in the visible region. The result of measurement of the radiation intensity of a UV lamp is in good agreement with the measurement data obtained using a calorimeter. Photocurrents are examined as parameters of light intensity, applied DC voltage, and chopping frequency.

1. Introduction

Interest in measurements of UV radiation intensity, including lithography techniques and medical applications related to UV radiation of the skin, has been increasing with the realization of sensing devices in this spectral region.[1-3] Depending on the particular applications, some factors such as photon sensitivity, signal-to-noise ratio, spectral response, filtering requirements, signal linearity, stability, and size can be important subjects. UV detectors for the mid- and near-UV spectral region (200–400 nm) may be classified into the following three types:[4,5] (1) thermal detectors including both the thermopiles and pyroelectric detectors; (2) those using photocathodes such as vacuum phototubes, UVtrons, and photomultipliers;[6] and (3) solid-state junction photodetectors such as silicon or gallium arsenide phosphide photodiodes.[7,8]