

## Visible absorption spectra of radiation exposed SIRAD dosimeters

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**Abstract.** SIRAD badge dosimeters are a new type of personal dosimeter designed to measure radiation exposure up to 200 R and give a visual qualitative measurement of exposure. This is performed using the active dosimeter window, which contains a radiochromic material amalgamated in the badge assembly. When irradiated, the badges active window turns blue, which can be matched against the given colour chart for a qualitative assessment of the exposure received. Measurements have been performed to analyse the absorption spectra of the active window, and results show that the window automatically turns a blue colour upon irradiation and produces two peaks in the absorption spectra located at 617 nm and 567 nm. When analysed with a common computer desktop scanner, the optical density response of the film to radiation exposure is non-linear but reproducible. The net OD of the film was 0.21 at 50 R exposure and 0.31 at 200 R exposure when irradiated with a 6 MV x-ray energy beam. When compared to the calibration colour strips at 6 MV x-ray energy the film's OD response matches relatively well within 3.5%. An approximate 8% reduction in measured OD to exposure was seen for 250 kVp x-rays compared to 6 MV x-rays. The film provides an adequate measurement and visually qualitative assessment of radiation exposure for levels in the range of 0 to 200 R.

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