Thermal decomposition reaction of gas-phase uranyl complexes as studied by in-situ IR spectroscopy

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Abstract

Thermal decomposition reaction of gas-phase UO2(hfacac)2 · THF was investigated in a static cell. IR spectroscopic method was used to study the thermal decomposition of gas phase uranyl complexes. The decomposition reaction products were separated by using thermal-gradient fractional sublimation method utilizing the differences in their volatility.

Fill Factor Enhancement for Optically Coupled Digital X-ray Mammography Imaging in the Breast Cancer Diagnostics

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Abstract

The Active Matrix Flat-Panel Imagers (AMFPIs) are being developed for x-ray detection systems. Indirect detection imagers typically use Gd2O2S:Tb or CsI:Tl scintillation screens to convert the x-ray into visible photons which are then collected by an underlying photodetector array for digital radiographic and mammographic applications. We have been investigating whether the inclusion of a microlens array between the screen and photodetector may improve light collection when the photodetector has a small optical fill factor. In this study, we present our technique for modeling the modulation transfer function (MTF) from measurement obtained for Gd2O2S:Tb and CsI:Tl scintillation screens and reported in the literature. The measurements were obtained for a number of different mono and polychromatic x-ray (energy) spectra. The screen MTFs were subsequently transformed into point spread functions (PSFs) and used in a simulation of the proposed imaging system. This imaging system makes a better image in the lower radiation exposure to patients.