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Absolute K-shell emission line brightness measurements of laser-irradiated targets at the National Ignition Facility (NIF)[1] M.A. BARRIOS, LLNL, S.P. REGAN, Univeristy of Rochester- LLE, K.B. FOURNIER, M. MAY, J. COLVIN, LLNL, R. OLSON, Sandia National Laboratories, J. KANE, K. WIDMANN, D. BRADLEY, G.W. COLLINS, LLNL, LAWRENCE LIVERMORE NATIONAL LABORATORY COLLABORATION, LABORATORY FOR LASER ENERGETICS, UNIVERSITY OF ROCHESTER COLLABORATION, SANDIA NATIONAL LABORATORIES COLLABORATION — X-ray K-shell-emission-line sources generated with under-dense laser-irradiated targets, including Ge and Zn pre-pulsed foils, Ge-doped silica aerogel, Kr gas targets, and a stainless-steel-lined cavity, were developed for radiographic and imaging applications on the NIF. Tailored laser pulses delivering up to 750 kJ of 3w light on target with peak laser power ranging from 14 to 150 TW were used to optimize laser-to-x-ray conversion efficiency (CE) for the various targets. The time-integrated, K-shell emission line brightness was measured using an absolutely calibrated, elliptically curved Bragg crystal spectrometer, measuring x rays between 6 and 16 keV. Absolute x-ray yields up to $\sim$10 kJ/sr for the He_α plus satellite emission from the mid-Z elements and corresponding CE up to 2.5% into He_α and $\sim$6% into 6.4-16 keV emission are reported and compared with simulated spectra.

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