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Radiographic imaging of solidification in Al-Cu alloys JASON COOLEY, AMY CLARKE, SETH IMHOFF, BRIAN PATTERSON, Los Alamos National Laboratory, WAH-KEAT LEE, Brookhaven National Laboratory, KAMEL FEZZAA, ALEXANDER DERIY, Argonne National Laboratory, TIM TUCKER, MARTHA BARKER, KESTER CLARKE, ROBERT FIELD, DAN THOMA, DAVID TETER, Los Alamos National Laboratory — Until the advent of third generation synchrotrons the ability to image the microstructure of metals during solidification was non-existent. Today's sources have sufficient energy and flux to perform real time radiographic imaging of solidification in thin samples with resolution sufficient to image dendrites, eutectic lamellae, and the density change across the solidification front. Feedback control of the solidification interface is also possible. We report on the radiographic imagining of Al-Cu eutectic alloys during solidification at the Argonne National Laboratory Advanced Photon Source. Cooling rates of up 10 degrees C / sec and, temperature gradients of up to 150 degrees C / cm were used to control the solidification. The samples were $\sim$ 100 microns thick and the field of view was $\sim$ 1.4 x 1.7 mm. The experimentally accessible phase space included both plane front and cellular growth regimes. The experimental resolution in the micron range was adequate to quantify cellular radii, cellular interface angles, lamellar interface angles, and lamellar spacing.

Jason Cooley
Los Alamos National Laboratory

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