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Measurements of Multiphase Fluid Mixing Using Synchrotron X-Ray Fluorescence[1] ALAN KASTENGREN, Advanced Photon Source, Argonne National Laboratory, BENJAMIN HALLS, TERRY MEYER, Iowa State University — Multiphase flows can prove problematic for the use of optical diagnostics due to the strong interaction of visible light with phase boundaries. X-ray absorption and phase-contrast imaging have been successfully used to probe multiphase fluid flows under a wide variety of conditions. This presentation will describe the use of another technique, x-ray fluorescence spectroscopy, to probe an impinging jet spray flowfield. The x-ray fluorescence technique will be described, including its advantages and drawbacks compared to other techniques, both optical and x-ray. Preliminary results from the impinging jet flowfield show that the fluid from each initial jet tends to congregate on the side of the sheet formed after the impingement point opposite the jet. This behavior was not expected prior to these measurements, demonstrating the utility of the fluorescence technique to probe the mixing of the two streams. Other potential applications for the x-ray fluorescence technique will also be briefly discussed.

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