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Molecular measurements in large Schmidt number Rayleigh-Taylor mixing NICHOLAS J. MUESCHKE, Texas A&M University, MALCOLM J. ANDREWS, Los Alamos National Laboratory — Current progress on experimental molecular mixing measurements in a small Atwood number, liquid phase, turbulent Rayleigh-Taylor mixing layer using an open-loop water channel facility is reported. In the experiments, the pH of the heavy (salt) and light (fresh) water streams is controlled by adding a set volume of either acid or alkali to each stream. As the two streams molecularly mix, the chemical reaction between the acid and alkali is marked by a Phenolphthalein chemical indicator, which is imaged under backlit conditions. Calibration of the imaging process provides a quantitative relationship between the amount of light absorption and the fraction of molecularly mixed fluid. The current mixing measurements are compared with previous measurements of molecular mixing in Rayleigh-Taylor experiments and simulations of various Atwood and Schmidt numbers. This research was sponsored by the U.S. DOE National Nuclear Security Administration under the Stewardship Science Academic Alliances program through DOE Research Grant #DE-FG03-02NA00060.

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