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Buoyancy-driven instabilities of acid-base fronts: the case of a color indicator L.A. RIOLFO, NLPC, Universite Libre de Bruxelles, Belgium, S. KUSTER, GMP, Universidad de Buenos Aires, Argentina, P.M.J. TREVELYAN, NLPC, Universite Libre de Bruxelles, Belgium, C. EL HASI, A. ZALTS, UNGS, Argentina, C. ALMARCHA, NLPC, Universite Libre de Bruxelles, Belgium, A. D'ONOFRIO, GMP, Universidad de Buenos Aires, Argentina, A. DE WIT, NLPC, Universite Libre de Bruxelles, Belgium — Buoyancy-driven hydrodynamic instabilities of acid-base fronts are studied both experimentally and theoretically in the case where an aqueous solution of a strong acid is put above a denser aqueous solution of a color indicator in the gravity field. The neutralization reaction between the acid and the color indicator as well as their differential diffusion modifies the initially stable density profile in the system and can trigger convective motion both above and below the initial contact line. The type of patterns observed as well as their wavelength and the speed of the reaction front are shown to depend on the value of the initial concentrations of the acid and of the color indicator and on their ratio. A reaction-diffusion model explains how the hydrodynamic instability scenarios change when the concentration of the reactants are varied.

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