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**A two-phase multi-physics model for simulating plasma discharge in liquids** ALI CHARCHI, TANVIR FAROUK, Department of Mechanical Engineering, University of South Carolina — Plasma discharge in liquids has been a topic of interest in recent years both in terms of fundamental science as well as practical applications. Even though there has been a large amount of experimental work reported in the literature, modeling and simulation studies on plasma discharges in liquids is limited. To obtain a more detailed model for plasma discharge in liquid phase a two-phase multiphysics model has been developed. The model resolves both the liquid and gas phase and solves the mass and momentum conservation of the averaged species in both the phases. The fluid motion equation considers surface tension, electric field force as well as gravitational force. To calculate the electric force, the charge conservation equations for positive and negative ions and also for the electrons are solved. The Possion's equation is solved in each time step for obtaining a self consistent electric field. The obtained electric field and charge distribution is used to calculate the electric body force exerted on the fluid. Simulation show that the coupled effect of plasma, surface and gravity results in a time-evolving bubble shape. The influence of different plasma parameters on the bubble dynamics is studied.

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