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Alkyl Polyoxyethylene Surfactant Residue Distribution after Sessile Droplet Evaporation.[1] KWAICHOW CHAN, SCOTT PIERCE, YUNJI MI, Albany State University, HEPING ZHU, USDA Agricultural Research Service, KWAICHOW CHAN COLLABORATION, HEPING ZHU COLLABORATION —
Post-evaporation residues of an Alkyl Polyoxyethylene surfactant on a slightly hydrophilic surface are studied. An edge-detecting contrast recognition algorithm is used to measure the areas of small (7-30μm diameter) surfactant "islands" which form during the evaporation process as a result of flows within the droplet and surface tension gathering. "Island" distributions broaden with increased concentration, accompanied by higher mean interior island size. Fitting the histogram of island sizes beginning with the principle peak reveals a general form: $y = (6 \times 10^8)Cx^{-\alpha}$ where y is frequency, C the concentration and α is a constant having value between 2.55 and 3.00. Log-log plots evidence a linear behaviour over two orders of magnitude. Total area covered does not increase in a linear fashion with concentration, as one may expect. Rather, a "critical" concentration is achieved at approximately 0.15%, above which area increase is less pronounced.

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