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Title: Dependence of the fluid convection in an evaporating sessile droplet on the thermal conductivity of the substrate

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The influence of thermal conduction in the substrate on the direction of fluid circulation in evaporating sessile droplets, which was originally observed and described in [1], has attracted much attention recently. As it is known from [1], the relative substrate-liquid thermal conductivity determines the sign of the tangential component of the temperature gradient at the surface close to the contact line, and, therefore, it determines the direction of the Marangoni convection. In this work we perform detailed numerical calculations of the effect and find more complicated convection patterns inside a drop. In particular, we find that either single vortex or several vortices are formed in the droplet depending on the thermal conductivity of the substrate. With the variation of the relative subtrate-liquid thermal conductivity a transition between the regimes with different numbers of vortices takes place along with the transition between circulation directions described in [1]. Our results show that the characteristics of the transition point for the reversal of the circulation direction quantitatively differ from that found in [1]. We associate the difference with the fact that the theoretical analysis was carried out in [1] in disregarding the curvature of the droplet surface near the contact line. Our numerical calculations taking into account real geometrical shape of the droplet with finite radii of curvature permits to refine the quantitative characteristics at the transition point. [1] W. D. Ristenpart, P. G. Kim, C. Domingues, J. Wan, and H. A. Stone, Physical Review Letters 99, 234502 (2007).