S3.2.1 DROPLETS INTERACTIONS WITH SMOOTH AND ROUGH FIBERS

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The physics of droplet interaction with surfaces is complex and depends on various properties. Among those, global geometry and roughness of the surface have an important effect on the shape of drops on surfaces. Since fibrous media have a unique set of properties, it makes them the first choice in many applications. This work presents the study of the different shapes of drops on fibers and the effect of surface roughness on the equilibrium shape of a droplet deposited on a fiber. An automatic image processing technique in MATLAB is used to study the shape and determine the volumes of axisymmetric barrel-shaped nanodroplets on smooth fibers from 2D images of droplets profiles. The shape of a droplet deposited on a rough fiber is also studied via the energy minimization method implemented in the Surface Evolver finite element code. It is found that surface roughness decreases droplet apparent contact angle on fibers. Furthermore, roughness increases the force required to detach a droplet from a fiber.