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Droplets interacting with structured microchannel walls RIELLE DE RUITER, MICHEL DUIJS, FRIEDER MUGELE, University of Twente — The presence of water droplets in oil-filled microfluidic systems influences the effective resistance of the microchannels. We study the effect of droplets interacting with topographically structured walls, for example single defects or a periodic array of grooves. Depending on the specific geometry and flow conditions, the droplet is trapped in or released from the structured region. Using a so-called microfluidic comparator (a microfluidic unit to compare flow rates in two channels), we quantify the effect of the presence of the droplet and its deformation by the flow on the effective resistance of the microchannel. These insights can be used to optimize the release of entrapped oil during enhanced oil recovery.

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