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Generating double emulsions W/O/W in a PDMS system by controlling locally the wetting properties of the channel HERVE WILLAIME, NICOLAS PANNACCI, POL GRASLAND-MONGRAIN, EMILIE-MARIE SOARES, MICHAEL BENZAQUEN, PATRICK TABELING, MMN, UMR 7083, ESPCI-CNRS — In microfluidic systems, it has been shown that wetting properties of the wall of the microchannel are of crucial importance for the generation of emulsions [1]: to generate an emulsion in a fluid, the continuous phase must wet the walls of the channel better than the dispersed phase. In the particular case of alternate double emulsions (water in oil in water), it is necessary to pattern the wetting properties of the channel. In this paper, we present preliminary works on the control of wetting properties on PDMS microchannels for the generation of double emulsion. The method we have chosen is inspired by the works of Allbritton [2] and Kumacheva [3] by UV-grafting a hydrophilic polymer onto the surface inside the microchannel. Once the channels are grafted, it is possible to obtain alternate double emulsions. We will present the objects obtained with such microchannels and will focus on their structures and on their stabilities. [1]Dreyfus R., Tabeling P., Willaime H., *Physical Review Letters*, **2003**, 90(14). [2] Hu S., Ren X., Bachman M., Sims C., Li G.P., Allbritton N. *Anal. Chem.* **2004,** 76, 1865-1870 [3] Seo M., Paquet C., Nie Z., Xua S., Kumacheva E. *Soft Matter*, **2007**, 3, 986–992

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