Abstract Submitted
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Direct observation of pore blocking and advanced adsorption in nanoporous alumina: cooperative effects at the origin of hysteresis[1] FELIX CASANOVA, CASEY E. CHIANG, University of California San Diego, CHANG-PENG LI, University of Michigan, IVAN K. SCHULLER, University of California San Diego — We tailor anodized alumina with independent pores with well-defined, simple geometries (inkbottle, funnel), in order to study the effects of pore morphology in hysteretical capillary condensation, independently from other cooperative processes such as network effects. We confirm, by direct observation using optical interferometry, the occurrence of two cooperative phenomena: the classical pore blocking effect in nearly ideal 'inkbottle' pores (which has usually been employed to describe hysteresis loops in disordered/interconnected porous materials) and the advanced adsorption in pores with a change in the cross section. Both effects have been predicted in theoretical and simulation works, but not directly observed experimentally before. They are relevant for the development of a theory of the poorly understood hysteresis in complex porous materials.

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