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Dendrite nanostructures formed by plasma-assisted vacuum evaporation of polymers

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Plasma-assisted vacuum evaporation of poly(ethylene oxide) (PEO) was used to deposit PEO-like thin films with different extent of cross-linking. These films were further used as substrates for deposition of poly(ethylene)-like (PE) plasma polymers. Formation of a dendrite pattern was observed during the initial stages of the PE-over-PEO plasma polymer growth. The PE dendrites expanded laterally with the deposition time until coalescence. However, their thickness remained constant at 7 nm until the area occupied by the dendrites reached about 50%. The shape of the PE-like dendrites depended on the cross-linking density of the underlying PEO-like plasma polymer but was rather independent on its chemical composition. It was concluded that flexibility of the PEO-like plasma polymer chains is a key parameter that limits the surface diffusion of incoming PE oligomers. Different amphiphilic surfaces with hydrophobic PE-like dendritic islands distributed randomly over hydrophilic PEO-like plasma polymers were produced by variation of the deposition time. Cell-adhesive properties of such films were studied *in vitro* in terms of adhesion of BALB/3T3 immortalized mouse fibroblasts.
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