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Figure S1: Schematic diagrams showing the formation of Type I nanofins.

Figure S1 shows the change in morphology of Type I nanofins over the course of etching. Because of the isotropic etching action of the plasma, the sides of the nanofins are exposed to considerable lateral etching which causes the top of the nanofins to become fully removed before the etch depth reaches $1\mu m$. This leads to Type I nanofins having a short height with a pinched tip as shown in Figure 2 Row I.



Supporting Information II

Supporting Information I



Figure S2 shows the water contact angles for PS treated with varying concentrations of CF₄ in CF₄/O₂ plasma. The water contact angle for an untreated PS surface is $83.5^{\circ} \pm 4.4^{\circ}$. Note that when the samples have their surface chemistry homogenized with a layer of thermally deposited aluminium 20nm in thickness, a relatively constant water contact angle is

obtained. This implies that dissimilar surface chemistry is the primary factor for the different surface energies of the samples observed.

The surface energy of PS is noted to fall with increasing CF₄ concentrations, as reflected by the increasing water contact angle. This is expected as increasing the fluorine content on polymer surfaces is known to lower their surface energies¹⁸. However, the water contact angle appears to be insensitive to the concentration of fluorine when the concentration is very low or very high, which causes the water contact angle to be more or less constant for $0\% \le \%$ CF₄ $\le 20\%$ and $60\% \le \%$ CF₄ $\le 100\%$. For $80\% \le \%$ CF₄ $\le 100\%$, remnants of the polymer deposited from CF_x species may have caused the water contact angle to maintain its high value even though fluorination of PS for this composition range is reduced.