Self-assembled monolayers of aliphatic thiols on InAs (100) planar surfaces. This included as first step the development and investigation of a thorough chemical InAs surface preparation step using a dedicated bromine/NH4OH-based etching process. Ellipsometry, contact angle measurements and atomic force microscopy (AFM) indicated the formation of smooth, surface conforming monolayers. The molecular tilt angles were obtained as 30 ± 10° with respect to the surface normal. Kelvin probe force microscopy (KPFM) measurements in hand with Parameterized Model number 5 (PM5) calculations of the involved molecular dipoles allowed for an estimation of the molecular packing densities on the surface. We obtained values of up to \( n = 10^{14} \text{ cm}^{-2} \) for the SAMs under study. These are close to what is predicted from a simple geometrical model that would calculate a maximum density of about \( n = 2.7 \times 10^{14} \text{ cm}^{-2} \). We take this as additional conformation of the substrate smoothness and quality of our InAs–SAM hybrid layer systems.

Stichworte:
Self-assembled monolayers; Thiols; InAs; Surface analysis; Kelvin probe force microscopy

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