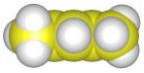
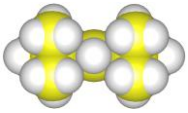
Table 1 Overview of the studied SMIs in this work. The shown 2D footprints are based on optimal binding configurations obtained from Density functional theory studies, and served as the input for random sequential adsorption simulations.

Abbreviations	**HAc**	**Hacac**	**Hthd**
Chemical formula	CH_3COOH	$CH_3COCH_2COCH_3$	$(CH_3)_3CCOCH_2COC(CH_3)_3$
Common names	Acetic acid	Acetylacetone	2,2,6,6-tetramethyl-3,5-heptanedione
Model with Van der Waals radius (top-view)			
Relative 2D footprint			

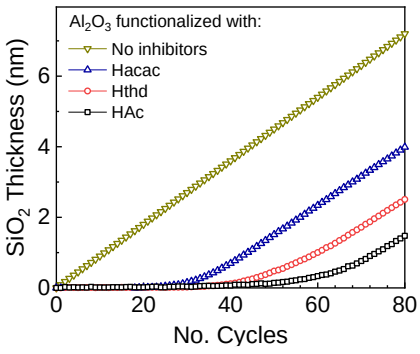


Figure 1 SiO_2 nucleation curves on Al_2O_3 without or with SMI surface functionalization.

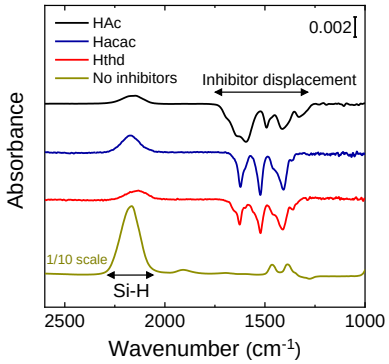


Figure 2 Precursor blocking by Hacac, Hthd or HAc, determined from infrared spectroscopy.

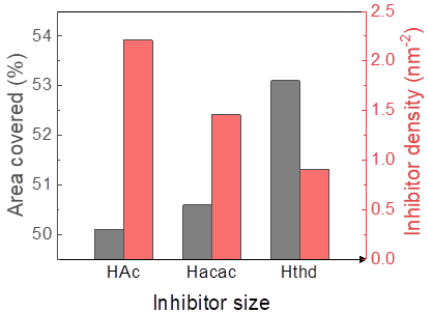


Figure 3 Overview of steric shielding and chemical passivation by SMIs as a function of inhibitor size.

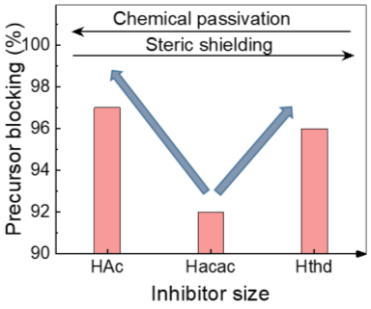


Figure 4 Precursor blocking from Figure 2 as a function of inhibitor size.

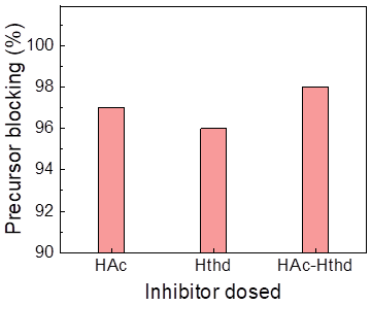


Figure 5 Precursor blocking using HAc, Hthd or combination of HAc-Hthd.