

# Self-organization of complete organic monolayers via sequential post-deposition annealing

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Organic molecular beam deposition has been used to surpass the chemical approach commonly adopted for coating SiO<sub>x</sub> surfaces, obtaining a smooth and uniform monomolecular layer of sexithiophene that fully covers the SiO<sub>x</sub> surface on the centimetre length scale. This result has been achieved by submitting sexithiophene sub-monolayer films grown at different substrate temperatures to a post-deposition annealing process. Through Scanning Probe Microscopy techniques, morphological, tribological and mechanical measurements have highlighted the existence of face-on molecular aggregates on the SiO<sub>x</sub> surface and their re-organization by means of a post-annealing process. Atomistic molecular dynamics simulations complement experimental observations, shedding light on the microscopic aspects of molecular diffusion and aggregates reorganization. Exploiting the molecular reorganization upon post-annealing, almost perfect 6T monolayers were grown through a sequence of deposition and annealing steps. This preparation technique represents a new route for changing surface properties by using high controlled monomolecular layers.