International Conference and Exhibition on **Naterials Chemistry**

March 31-April 01, 2016 Valencia, Spain

One-pot waterborne superhydrophobic pigment coatings at high solids with improved scratch and water resistance

Agne Swerin^{1,2}, Mikael Sundin¹ and Martin Wåhlander^{1,2} ¹SP Technical Research Institute of Sweden, Sweden ²KTH Royal Institute of Technology, Sweden

A pigment coating was developed to achieve superhydrophobicity in one step from a waterborne formulation containing aragonite Calcium carbonate, hydrophobized using sodium oleate, latex binder and cross-linker. Coatings formulated \leq 50 mass% and applied to polyethylene coated paperboard substrates displayed typical superhydrophobic features: water contact angles \geq 150°, low roll-off angle and low stain sizes, but poor scratch and water resistance as well as foaming issues during preparation. Reformulation at higher solids content significantly improved scratch and water resistance properties. Water rinsing of the dried coatings further increased the water barrier capacity due to reduced surfactant-assisted wetting; findings were corroborated by detailed surface chemistry analyses showing the removal of surface-active components after water rinsing of the dried coatings. A plausible cause for the improved durability is the fact that capillary forces increase exponentially with increasing pigment volume fraction (power law exponent of 2.2) leading to efficient binder coverage during the early stage of pigment coating consolidation.

Biography

Agne Swerin is Research Director at SP Technical Research Institute of Sweden – Chemistry, Materials and Surfaces and Troëdsson Professor in Forest-based Surface Chemistry at KTH Royal Institute of Technology, Division of Surface and Corrosion Science.

agne.swerin@sp.se

Notes: