

Continuous coating of discrete areas of a flexible web

The use of surface energy (wettability) contrast to direct liquid into designated areas, so that flexible substrates can be coated with a discrete pattern in a continuous, roll-to-roll manner is described. The method makes use of a substrate prepatterned with lyophilic and lyophobic regions. When this substrate is over-coated with the target liquid, the liquid withdraws from the lyophobic areas and collects on the lyophilic ones. The surface-energy pattern and the liquid can be applied by a variety of different methods, but we have focused on printing the patterns by flexography and slide coating the target liquid. A benefit of the technique is that coatings of subsequent layers with the same pattern are self-aligned with the previous layer, since they are directed by the same surface energy pattern. The capability to perform simultaneous multi-layer patterned coating in a single-pass operation is also demonstrated.

© 2007 American Institute of Chemical Engineers.