

# Method for the Preparation of Hydrophilic/Hydrophobic Patterned Surfaces with Photoinitiated Hydrosilylation

Yutaka Furukawa, Taiki Hoshino, Yoshitomi Morizawa

Research Center Asahi Glass Company, Limited, 1150 Hazawa-Cho, Kanagawa-Ku, Yokohama-Shi, Kanagawa 221-8755, Japan

Received 14 July 2008; accepted 7 October 2008

DOI 10.1002/app.29452

Published online 23 January 2009 in Wiley InterScience (www.interscience.wiley.com).

**ABSTRACT:** Recently, there has been considerable interest in hydrophilic/hydrophobic patterned surfaces because they serve as important templates for the selective deposition of various materials. We report a novel and simple method for the creation of hydrophilic/hydrophobic patterned surfaces using soft UV irradiation (365-nm wavelength). The method employs a photoinitiated hydrosilylation reaction of vinyl-terminated polydimethylsiloxane with H—Si groups catalyzed by platinum(II) acetylacetonate. In UV-irradiated regions, the photohydrosilylation reaction occurs, forming hydrophobic regions. In unirradiated regions, the remaining H—Si groups are converted into HO—Si groups in the presence of aqueous sodium hydroxide to form hydrophilic regions. The photoinitiated hydrosilylation reaction is completed within a little over

1 min, and this has been confirmed by reflection-absorption spectroscopy. The value of the water contact angle for the hydrophilic regions is about 10°, and that for the hydrophobic regions is about 103°. The success of pattern formation at the micrometer scale has been confirmed by scanning electron microscopy. The difference in the chemical structure at the surface has been confirmed by the decoration of the hydrophilic regions by a fluorescent dye and characterization with a fluorescence analyzer. Atomic force microscopy has shown that the height of the hydrophobic regions is about 20 nm. © 2009 Wiley Periodicals, Inc. *J Appl Polym Sci* 112: 910–916, 2009

**Key words:** coatings; microstructure; photopolymerization; polysiloxanes; thin films