

7th International Conference on

Smart Materials and Structures

July 02-03, 2018 | Vienna, Austria

h-BN nanoparticle gradient in glass coating

H Erdem Çamurlu and Esin Akarsu
Akdeniz University, Turkey

In order to obtain functional nanocomposite coatings, nanoparticles of various kinds such as ZrO_2 , Al_2O_3 , TiO_2 , SiO_2 were added in diverse kinds of matrices via sol-gel technique. As compared to other techniques, sol-gel provides the opportunity for forming micrometer or nanometer thick functional coatings. In the present study, stainless steel plates were coated with glass coatings having SiO_2 - K_2O - Li_2O components. Spin coating was utilized for forming the coatings from the sol. Hexagonal boron nitride (hBN) particles were added into the sol, in order to introduce hBN particles to the obtained films. In some experiments, surfaces of the hBN particles were modified by hydrophobic agents prior to their introduction into the coating sols. Hydrophobic modification on hBN nanoparticles' surfaces was conducted in order to provide a zone richer in hBN on the air-coating interface. Curing of the films was performed at 500°C for one hour in air. Characterization of the obtained films was performed by X-ray diffraction (XRD), scanning electron microscope (SEM), Fourier transform infrared (FTIR) spectroscopy, thermo-gravimetric analysis (TGA), friction coefficient measurements and atomic force microscopy (AFM). Thicknesses of the coatings were in 1–3 μm range. A uniform thickness was observed in different parts of the films, thanks to spin coating process. The friction coefficients were seen to be slightly lower when modified hBN nanoparticles were used in the coatings.

Recent Publications

1. Çamurlu H E, Mathur S, Arslan O and Akarsu E (2016) Modification of hexagonal boron nitride nanoparticles with fluorosilane. *Ceram. Int.* 42:6312–6318.
2. Çamurlu H E, Akarsu E, Arslan O and Mathur S (2016) Nanocomposite glass coatings containing hexagonal boron nitride nanoparticles. *Ceram. Int.* 42:8856–8862.
3. Çamurlu H E, Kesmez Ö, Burunkaya E, Kiraz N, Yeşil Z, et al. (2010) Sol-gel thin films with anti-reflective and self-cleaning properties. *Chem. Pap.* 66:461–471.
4. Kesmez Ö, Çamurlu H E, Burunkaya E and Arpaç E (2010) Preparation of antireflective SiO_2 nanometric films. *Ceram. Int.* 36:391–394.
5. Kesmez Ö, Çamurlu H E, Burunkaya E and Arpaç E (2009) Sol-gel preparation and characterization of anti-reflective and self-cleaning SiO_2 - TiO_2 double layer nanometric films. *Sol. Energ. Mat. Sol. C.* 93:1833–1839.

Biography

H Erdem Çamurlu completed his PhD in 2006 at the Middle East Technical University, Ankara, Turkey. Currently, he is an Associate Professor in the Mechanical Engineering Department of Akdeniz University, Antalya, Turkey. He has published more than 35 papers in reputed journals.

erdemcamurlu@gmail.com

Notes: