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Cold atmospheric pressure plasma polymerization of hexamethyldisiloxane for improved wood plastics composites PATRICK PEDROW, WILLIAM LEKOBOU, ERIK WEMLINGER, KARL ENGLUND, Washington State University, MARIE-PIERRE LABORIE, University of Freiburg — Polyolefin-based plastic composites have become a large class of construction material for exterior applications. One of the main disadvantages of wood/plastic composites resides in the low compatibility between the polar and hydrophilic surface of wood and the non-polar and hydrophobic polyolefin matrix, hindering the dispersion of the wood flour in the polymer matrix and resulting in lower mechanical properties for the composite. To improve interfacial compatibility wood flour can be pretreated with environmentally friendly methods such as plasma treatment. We evaluate here the efficacy of DC atmospheric pressure cold plasma polymerization of hexamethyldisiloxane (HMDSO) on wood flour to improve its compatibility with polyolefins. This presentation will describe the reactor design used to modify various surfaces using HMDSO plasma polymerization in argon. The characteristics of the plasma generated using a multipoint-to-short right circular cylinder configuration for a voltage range of 5 to 7 kV and the optimal conditions for polymerization on the substrate will also be presented. Finally we discuss the characteristics and properties of the plasma polymerized film obtained on mica, glass and wood veneers using atomic force microscopy (AFM) and infrared spectroscopy (FTIR).

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