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Atmospheric pressure cold plasma treatment of cellulose based fillers for wood plastic composites WILLIAM LEKOBOW, KARL ENGLUND, PATRICK PEDROW, LOUIS SCUDIERO, Washington State University — The main challenge of wood plastic composites (WPC) resides in the low interfacial adhesion due to incompatibility between the cellulose based filler that has a polar surface and most common matrixes, polyolefins which are non-polar. Plasma treatment is a promising technique for surface modification and its implementation into the processing of WPC would provide this industry with a versatile and nearly environmentally benign manufacturing tool. Our investigation aims at designing a cold atmospheric pressure plasma reactor for coating fillers with a hydrophobic material prior to compounding with the matrix. Deposition was achieved with our reactor that includes an array of high voltage needles, a grounded metal mesh, Ar as carrier gas and C_2H_2 as the precursor molecule. Parameters studied have included gas feed rates and applied voltage; FTIR, ESCA, AFM and SEM imaging were used for film diagnostics. We will also report on deposition rate and its dependence on radial and axial position as well as the effects of plasma-polymerized acetylene on the surface free energy of cellulose based substrates.

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