NANOPARTICLES VAPOR DEPOSITION AND MOLECULAR VAPOR DEPOSITION METHODS AS TOOLS FOR COTTON FABRIC SURFACE FUNCTIONALIZATION N. Abidi P. Aminavi

L. Cabrales Eric Hequet Fiber and Biopolymer Research Institute, Dept of Plant and Soil Science Texas Tech University Lubbock, TX

<u>Abstract</u>

Cotton fabric was functionalized using Nanoparticles Vapor Deposition (NVD) and Molecular Vapor Deposition (MVD) methods to impart super hydrophobic and olephobic properties. The NVD method is used to deposit a layer of aluminum oxide (Al₂O₃) nanoparticles on the fabric surface. The MVD method leads to a deposition of a functional layer of (Tridecafluoro-1,1,2,2,-tetrahydrooctyl) trichlorosilane. The nanoparticles increases the surface roughness, leading to higher contact angles when compared with surfaces functionalized only with (Tridecafluoro-1,1,2,2,-tetrahydrooctyl)trichlorosilane. The morphology of the treated surfaces was observed with SEM. The FTIR spectra showed the presence of peaks corresponding to fluorocarbon chains and aluminum oxide on functionalized samples. Surface free energies of the samples were calculated using different methods. Dynamic contact angles higher than 150° were obtained for water and other organic liquids for the treated samples. In addition, these samples showed low hysteresis when performing advancing and receding contact angles with water.