

Tailoring Heat Transfer and Bactericidal Response in Multifunctional Cotton Composites

Lilian Pérez Delgado ^{1,*}, Adriana Paola Franco-Bacca ¹, Fernando Cervantes-Alvarez ¹, Elizabeth Ortiz-Vazquez ², Jesús Manuel Ramon-Sierra ², Víctor Rejon ¹, María Leopoldina Aguirre-Macedo ³, Juan José Alvarado-Gil ¹ and Geonel Rodríguez-Gattorno ^{1,*}

¹ Merida Unit, Functional Materials Laboratory, Applied Physics Department, Center for Research and Advanced Studies (CINVESTAV), C.P. 97310 Merida, Mexico; adriana.franco@cinvestav.mx (F.-B.A.P.); fernando.cervantes@cinvestav.mx (C.-A.F.); vrejon@cinvestav.mx (R.V.); juan.alvarado@cinvestav.mx (A.-G.J.J.)

² Merida Unit, Laboratory of Applied and Molecular Microbiology, National Technological Institute of Mexico, C.P. 9711 Merida, Mexico; elizabeth.ov@merida.tecnm.mx (O.-V.E.); jesus.rs@merida.tecnm.mx (R.-S.J.)

³ Merida Unit, Aquatic Pathology Laboratory, Marine Resources Department, Center for Research and Advanced Studies (CINVESTAV), C.P. 97310 Merida, Mexico; leopoldina.aguirre@cinvestav.mx

* Correspondence: lilian.perez@cinvestav.mx (D.L.P.); geonelr@cinvestav.mx (R.-G.G.)

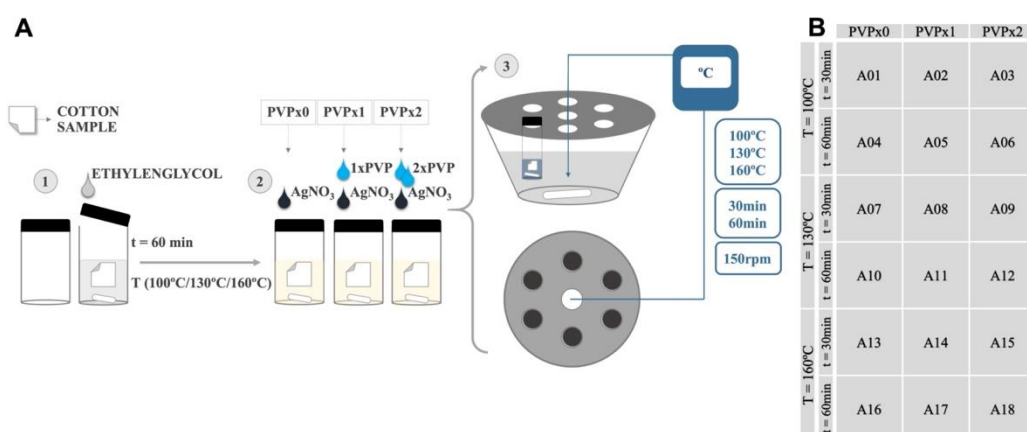


Figure S1. (A) Descriptive three steps diagram of the general methodology for the coating of AgNPs on textile fibers. The synthesis process was carried out in a self-design device with a glass base, metal cover, six holes for hexagonal distribution samples and a central one for the temperature sensor and vapor outlet. (B) Distribution of eighteen samples according to the selected reaction parameters.

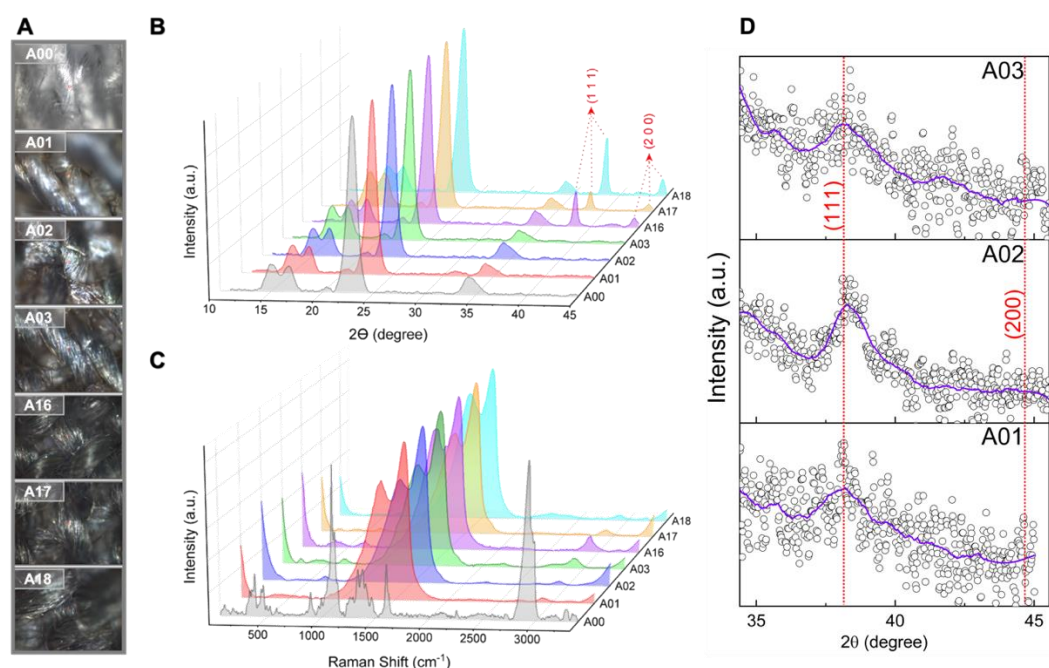


Figure S2. (A) Digital microscope images, (B) XRD and Raman (C) spectra of threads from bare cotton (A00) and six selected AgNPs@cellulose samples: A01 ($T = 100^{\circ}\text{C}$, $t = 30$ min, PVPx0), A02 ($T = 100^{\circ}\text{C}$, $t = 30$ min, PVPx1), A03 ($T = 100^{\circ}\text{C}$, $t = 30$ min, PVPx2), A16 ($T = 160^{\circ}\text{C}$, $t = 60$ min, PVPx0), A17 ($T = 160^{\circ}\text{C}$, $t = 60$ min, PVPx1) and A18 ($T = 160^{\circ}\text{C}$, $t = 60$ min, PVPx2). (D) magnification of the angular range where reflections of the metallic silver are expected, for samples A01, A02 and A03.

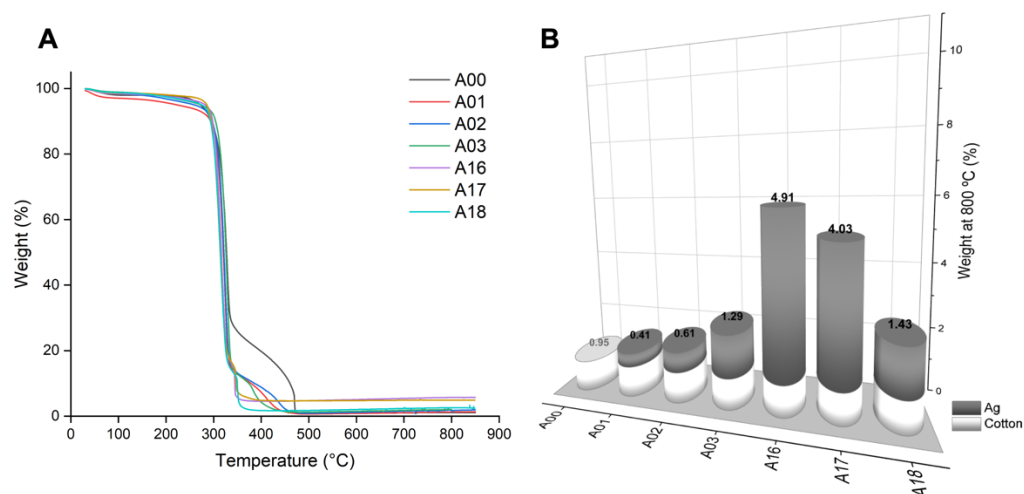


Figure S3. TGA curves (A) and percentage weight values at 800 °C. (B) of bare cotton (A00) and six selected AgNPs@cellulose samples: A01 ($T = 100^{\circ}\text{C}$, $t = 30$ min, PVPx0), A02 ($T = 100^{\circ}\text{C}$, $t = 30$ min, PVPx1), A03 ($T = 100^{\circ}\text{C}$, $t = 30$ min, PVPx2), A16 ($T = 160^{\circ}\text{C}$, $t = 60$ min, PVPx0), A17 ($T = 160^{\circ}\text{C}$, $t = 60$ min, PVPx1) and A18 ($T = 160^{\circ}\text{C}$, $t = 60$ min, PVPx2).