coatings

MDPI

Supplementary Materials

A Dual Active-Passive Coating with Intumescent and Fire-Retardant Properties Based on High Molecular Weight Tannins

Francisco Solis-Pomar [1], Andrés Díaz-Gómez [2], María Elizabeth Berrío [2], Jesús Ramírez [2], Andrés Felipe Jaramillo [3], Katherina Fernández [4], David Rojas [2], Manuel Francisco Melendrez [2,5] and Eduardo Pérez-Tijerina [1,*]

[1] Facultad de Ciencias Físico-Matemáticas, Universidad Autónoma de Nuevo León, San Nicolas de los Garza, Nuevo León 66451, México, francisco.solispm@uanl.edu.mx
[2] Interdisciplinary Group of Applied Nanotechnology (GINA). Hybrid Materials Laboratory (HML). Department of Materials Engineering (DIMAT), Faculty of Engineering, University of Concepcion, 270 Edmundo Larenas, Box 160-C, Concepcion 4070409 Chile; andresdiaz.qind@gmail.com (A.D.–G.), alframirez09@gmail.com (J.R), maelibeni2018@gmail.com (M.E.B), davrojas@udec.cl (D.R.), luismontoya@udec.cl (L.F.M); mmelendrez@udec.cl (M.F.M.)
[3] Departament of Mechanical Engineering, Universidad de La Frontera; 01145 Francisco Salazar, Temuco 4780000, Chile; andresfelipe.jaramillo@ufrontera.cl
[4] Laboratory of Biomaterials, Department of Chemical Engineering, Faculty of Engineering, University of Concepcion, Barrio Universitario s/n, P.O. Box 160-C, Concepción 4030000, Chile; kfernandeze@udec.cl (K.F)
[5] Unidad de Desarrollo Tecnológico; 2634 Av. Cordillera, Parque Industrial Coronel, Box 4051, Concepción 4191996, Chile
* Correspondence: eduardo.pereztj@uanl.edu.mx

Table S1. Variation of percentage compositions of PER, ME, and MAP on basic formulation.

Component	Variation (%)			
	BF1	**BF2**	**BF3**	**BF4**
Ratio MAP/PER	2.8	1.9	1.5	0.8
MAP	25.0	25.0	25.0	15.0
PER	9.0	13.0	15.0	18.0
ME	7.4	12.0	14.0	18.0

Preliminary studies: The percentage of each component was varied in order to verify which of these had the best intumescent and fire-retardant behavior before adding the tannin to the base formulation (BF).

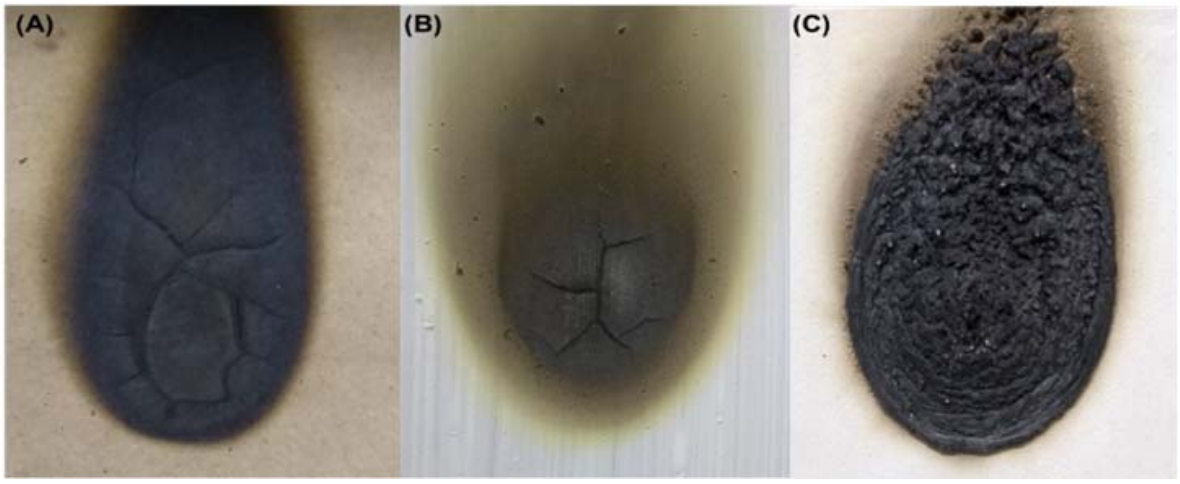

Figure S1. Fire response and foaming of (**A**) uncoated wood, (**B**) coating with SPP as catalyst (BF-SPP), and (**C**) MAP as catalyst (BF-MAP).

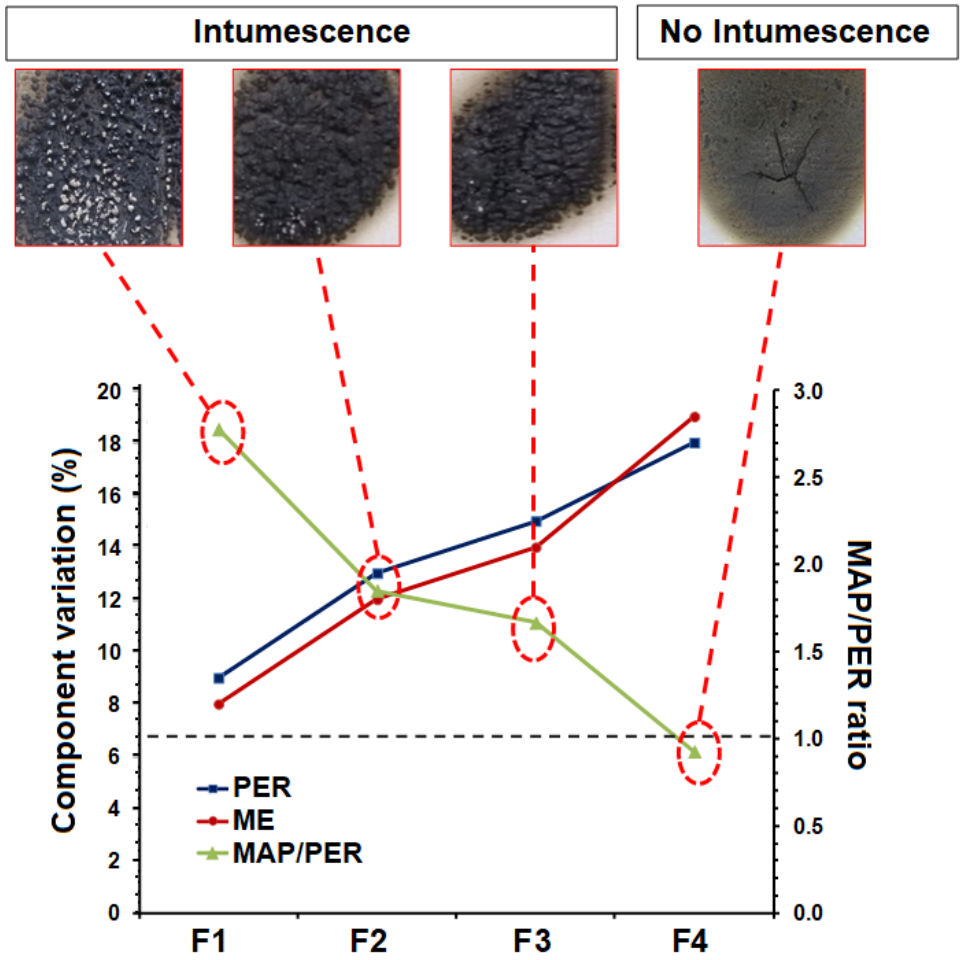

Figure S2. Intumescence properties according to the variation of the basic components of the formulation.

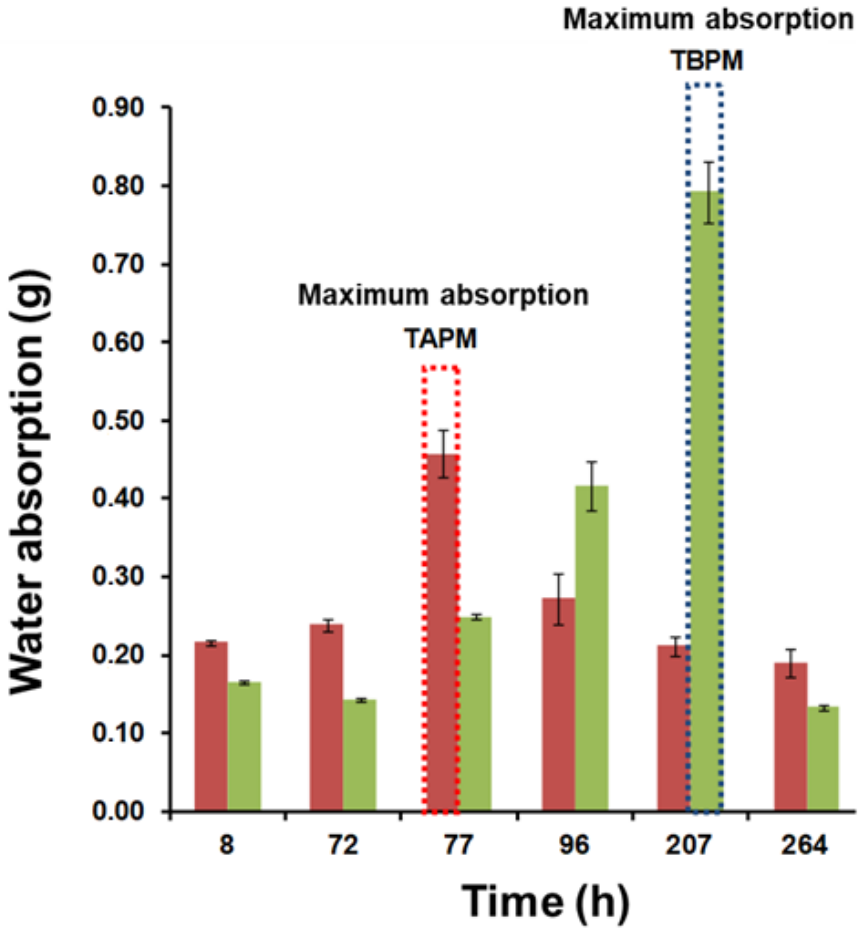

Figure S3. Water absorbed by H-MWT and L-MWT in periods between 8 and 264 h.

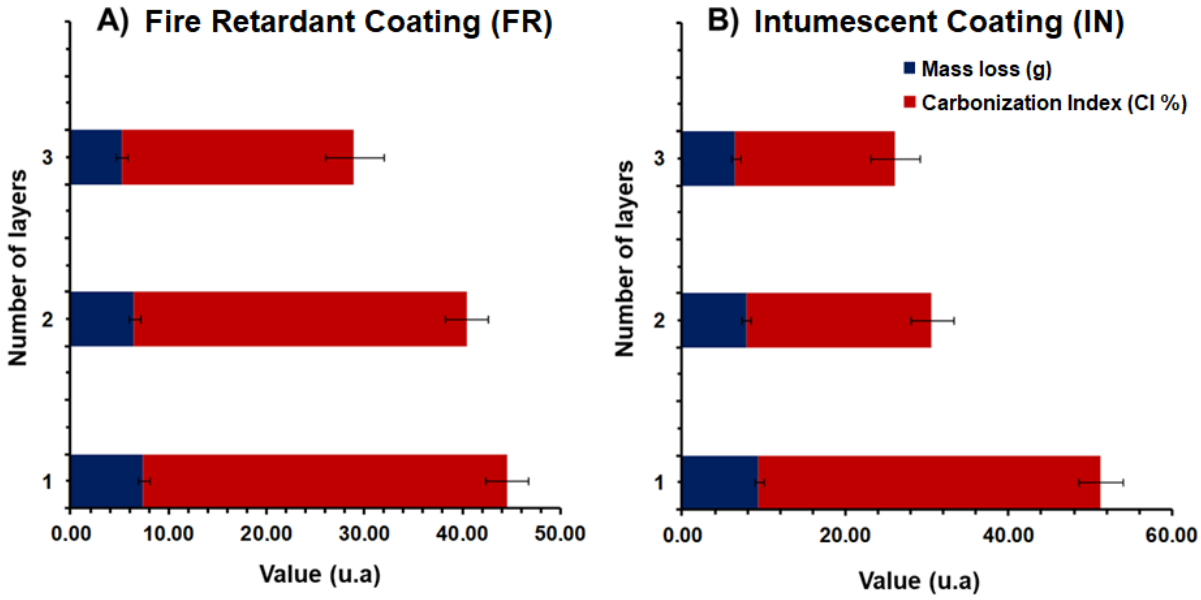

Figure S4. Mass loss and carbonization index of (**A**) intumescent (FT5) and (**B**) fire-retardant (FT1) coatings.

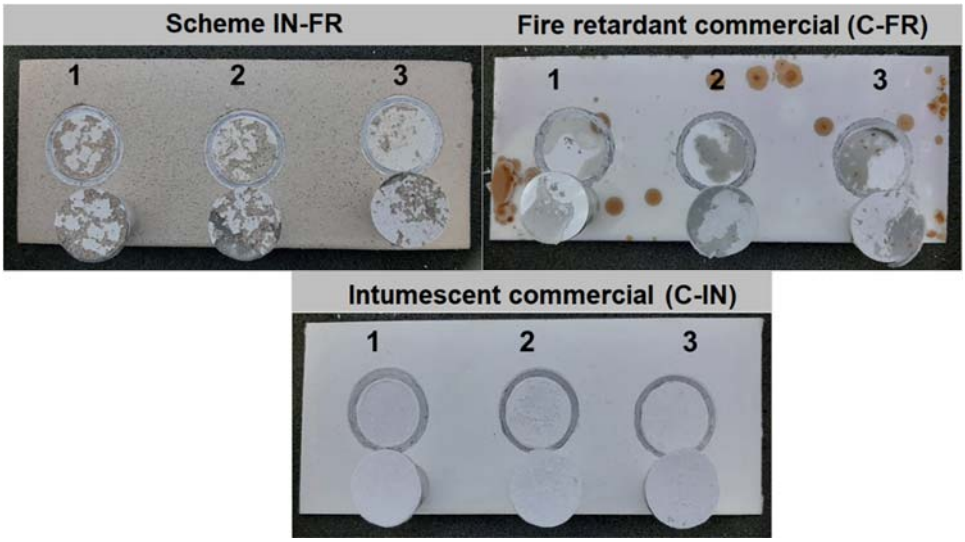

Figure S5. Resistance to detachment by adherence of the dual scheme on metal substrates with respect to the respective commercial coating.

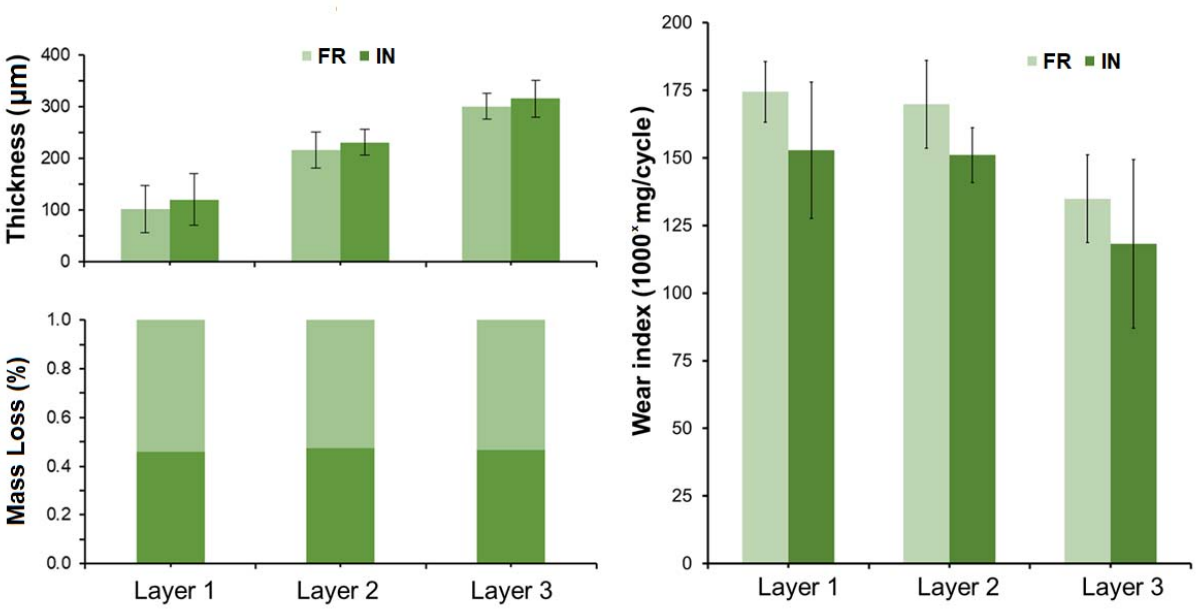

Figure S6. Abrasion test for fire retardant (FR) and intumescent (IN) coatings on metal with increasing thickness.