SUPPORTING INFORMATION

for

Single-Stage Synthesis and Characterization of Reflective and Conductive Silver-Polyimide Films Prepared from Silver(I) Complexes with ODPA/4,4'-ODA

by

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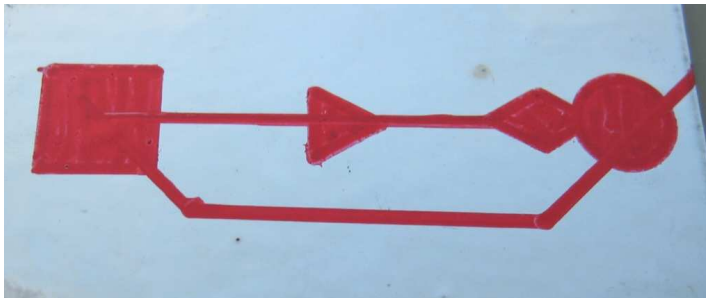
D

A

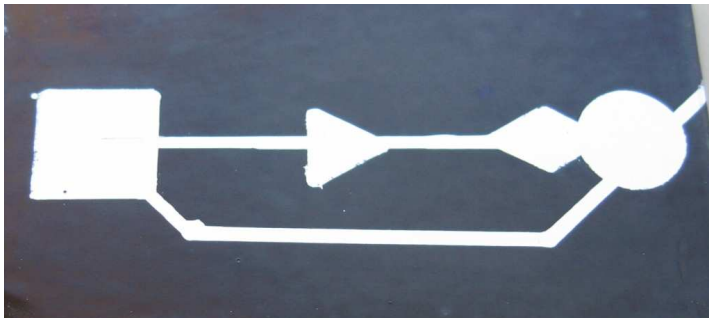
Silvered polyimde film

B



Sanford red ink patterned film A above.

C



Etched film B above followed by washing Sanford ink from the pattern with ethanol.

Figure 1 SI. Right side: A is a photograph of a 13% silvered film prepared from AgTFA and ODPA/4,4′-ODA heated to 300 °C for 5 h. The film is taped to a glass petrographic slide, 27 x 46 mm with double-sided tape; **B** is a photograph of the patterned film A using a Sanford permanent red marker (blue color is an artifact of amateur photography); **C** is a photograph of the Transene Company, Inc. Silver Etchant Type TFS-treated film to remove excess, unpatterned silver followed by washing off the ink mask with ethanol yield the final silver-patterned film. **Left side: D** Is a photograph of A showing the reflection of the lens portion of the camera.

All photograph were done free hand and without lighting control, and thus are not at a professional standard.

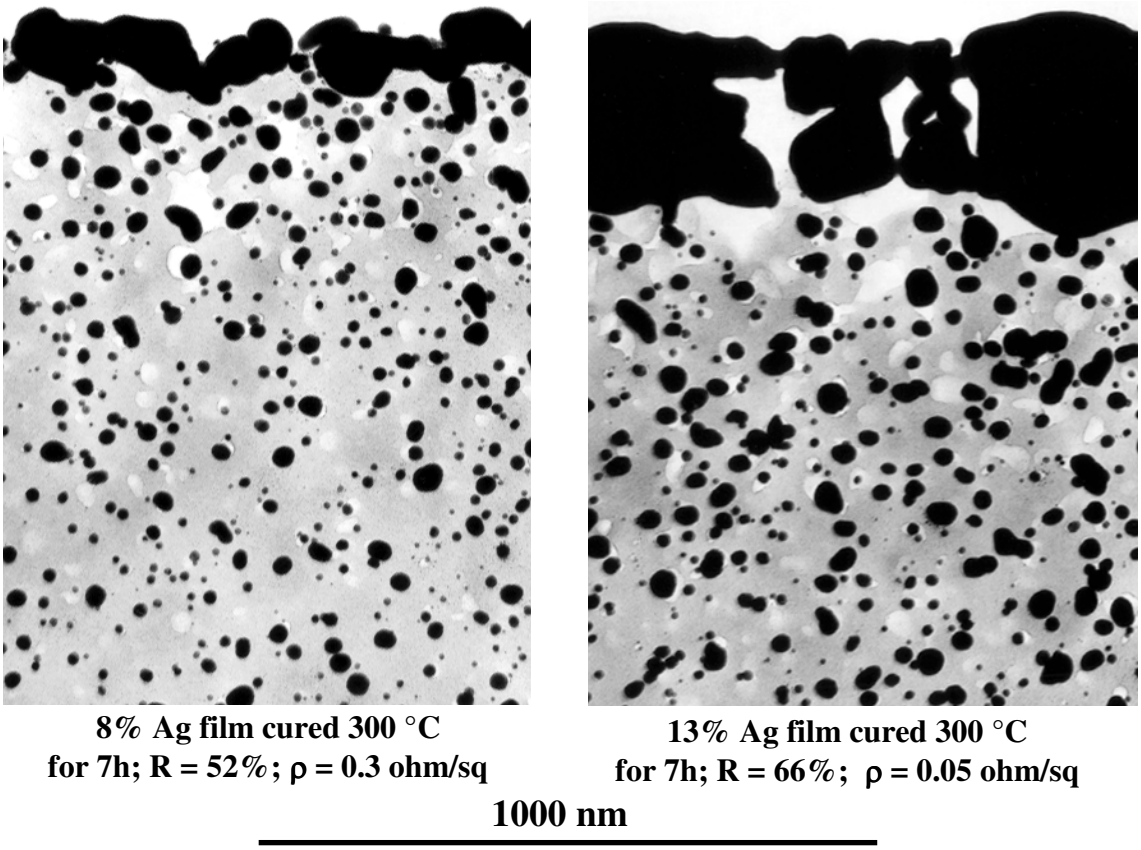


Figure 2 SI. Left: Transmission electron micrograph for 8% and 13% AgTFA-ODPA/4,4'-ODA film cured to 300 °C for 7h. For comparison, the TEM for the 13% analog is at the right. Both films are electrically conductive at the surface. The bulk resistivities are ca. 1.5 x 10^{-6} and 1.0 x 10^{-6} ohm-cm, respectively.

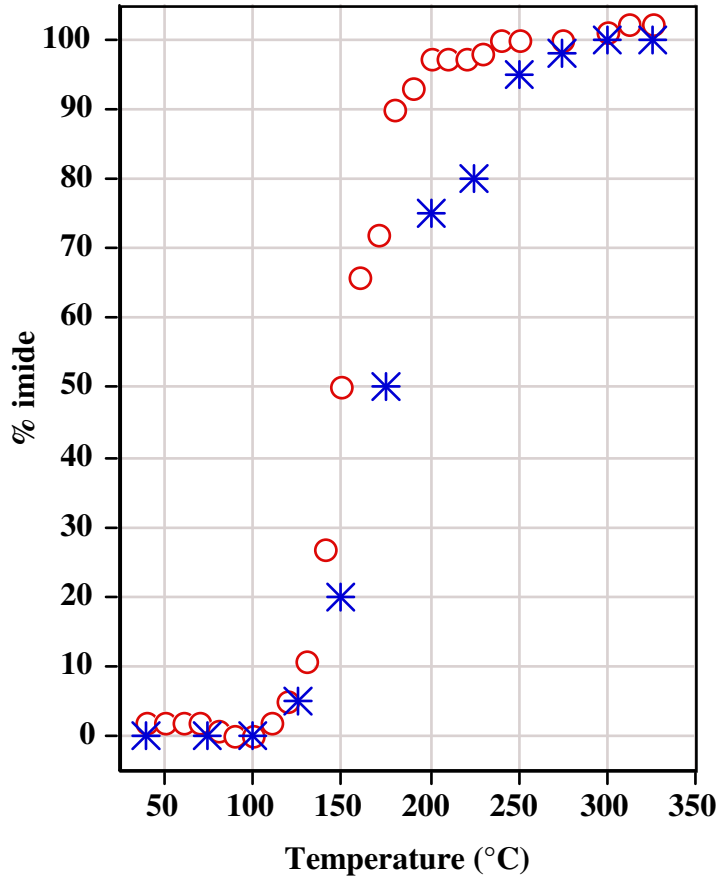


Figure 3 SI. The imidization of poly(amic acid) films to the final polyimide form as a function of temperature. Curves constructed from data in Shin, T.; Ree, M. Ree: Poly(3,4'-oxydiphenylene pyromellitic acid - PMDA/3,4'-ODA) 1. Time-resolved infrared spectroscopic study of thermal imidization in thin films. *Macromol. Chem. Phys.* 2002, *203*, 791-800 and Young, P. R.; Davis, J. R. J.; Chang, A. C.; Richardson, J. N. Characterization of a thermally imidized soluble polyimide (6FDA/4-BDAF) film. *J. Polym. Sci., Part A: Polym.* 1990, *28*, 3107-3122. (○) PMDA/3,4'-ODA; (✳) 6FDA/4-BDAF

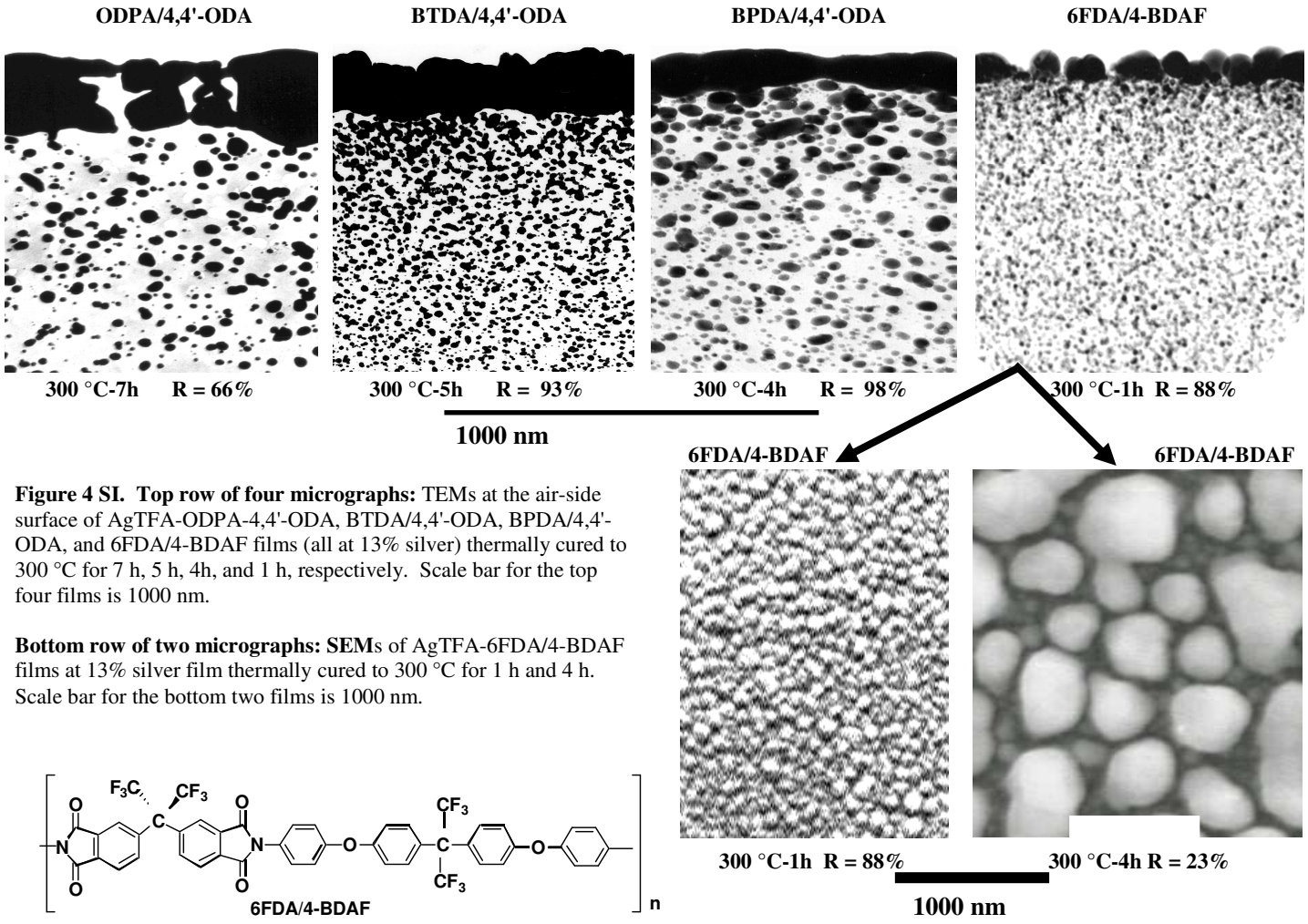


Figure 4 SI. Top row of four micrographs: TEMs at the air-side surface of AgTFA-ODPA-4,4'-ODA, BTDA/4,4'-ODA, BPDA/4,4'-ODA, and 6FDA/4-BDAF films (all at 13% silver) thermally cured to 300 °C for 7 h, 5 h, 4h, and 1 h, respectively. Scale bar for the top four films is 1000 nm.

Bottom row of two micrographs: SEMs of AgTFA-6FDA/4-BDAF films at 13% silver film thermally cured to 300 °C for 1 h and 4 h. Scale bar for the bottom two films is 1000 nm.

6FDA/4-BDAF

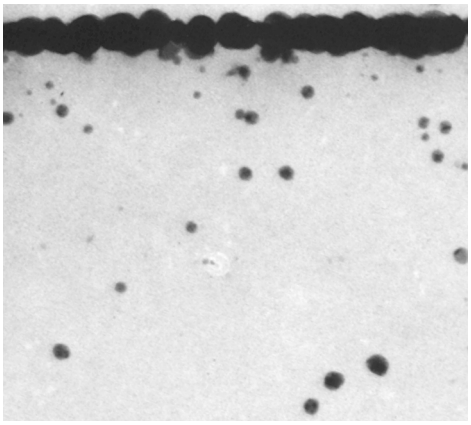


Figure 5 SI. Transmission electron micrograph of a 2 wt % silver 6FDA/4-BDAF film prepared using AgHFA cured to 300 °C for 0 h. The particles are isolated from one another just beneath the surface, thus, the silver layer is not conductive. Thermal cure cycle same as for Figure 2 of the published paper.