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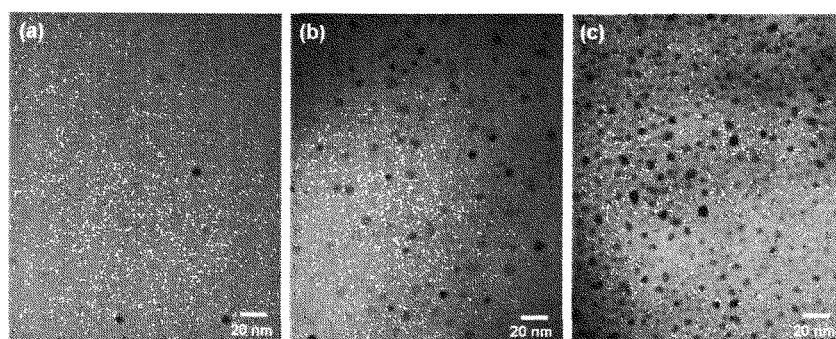
## The Synthesis and Properties of Zn-Oxide Nanoparticles Dispersed in a Polyimide Film

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The formation of metal oxide nanoparticles in a polyimide (PI) film has been investigated<sup>[1-3]</sup>. The PI precursors used in this study were BPDA-PDA and ODPDA-3SDA type polyamic acids (PAAs). PAA was spin-coated onto Zn thin films which had been deposited on the SiO<sub>2</sub>/Si, glass, or quartz substrates. The thin film stacks were soft-baked at 135 °C for 30 minutes and cured at the temperature between 250 °C and 350 °C for various holding time in a nitrogen atmosphere. Zn thin film reacted with PAA, and ZnO nanoparticles precipitated during imidization of PAA into PI. The morphology, the size and the density of particles were characterized using transmission electron microscopy (TEM). Optical absorption measurement was carried out to investigate the optical properties of ZnO nanoparticles in the PI film. The formation of ZnO nanoparticles was verified by TEM images shown as Fig. 1. The particle size and density depended on the curing condition. The technique proposed by our research provides a convenient way of fabrication nanoparticles economically and efficiently.

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**Figure 1.** TEM plan-view images of ZnO nanoparticles dispersed in BPDA-PDA type polyimide matrix with different curing holding time. (a) 350 °C for 1 hour, (b) 350 °C for 2 hours, and (c) 350 °C for 4 hours.

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