

Abstract Submitted
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Fluorescent security markers on ZnO nanowires¹ KRISTY WARREN, MARIAN TZOLOV, None — Zinc oxide is an efficient emitter of light thanks to the large exciton binding energy of 60 meV. The narrow emission lines from ZnO nanowires can be used as an enhanced security feature in documents and can be easily recognized from the background originating from the paper itself. We have studied the emission properties of ZnO nanowires in the UV range and how they can be implemented into paper products for document security. The zinc oxide nanowires were synthesized by chemical vapor transport and postprocessed in solution. The nanowires were dispersed using a sonicator into nitric acid water solutions with a pH of 2 and 4, and ammonium hydroxide water solution with a pH of 5 and 7. The morphology of the dispersed ZnO nanowires was imaged under a scanning electron microscope. Fluorescence measurements have shown better light emission from the nanoparticles dispersed in the basic pH solution. This material was then implemented into crafted paper and viewed under UV lamps and with a spectrometer. We have studied the loading of the paper with ZnO nanoparticles. A comparison was done with equivalently processed material of ZnO in powder form. The implementation of zinc oxide nanowires into paper products can advance document security at a relatively low cost.

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