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GaN nanostructures-poly(vinyl alcohol) composite based hydrostatic pressure sensor device

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Abstract

The wide band-gap semiconductor material gallium nitride was synthesized using a one step microwave-assisted solution phase technique. The synthesized GaN nanocrystals showed an intense ultraviolet-blue emission typical of GaN materials. Hydrostatic pressure sensors were fabricated using a GaN/polyvinyl alcohol (PVA) composite film deposited onto an interdigitated electrode and studied by measuring the change in alternating current conductance of the devices at varied applied pressures. Three different GaN concentrations of 29, 50 and 67% were used. A very high sensitivity in the range 100e200 kPa was observed for these devices. The composite devices demonstrated both response and recovery times of less than 16 s.