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**ZnO nanobelts for sensing NH4+ ions in aqueous buffer** KALPESH UPADHYE, Department of Bioengineering, University of Pittsburgh, SCOTT MAO, Department of Department of Mechanical Engineering, University of Pittsburgh, HAI LIN[1], Department of Bioengineering, University of Pittsburgh — An array of ZnO nanobelts is used for sensing changes in ammonium concentration and pH in aqueous environment. AC and DC measurements are performed to determine the conductive properties of the nanobelts. No significant changes in the DC resistance of the nanobelts are observed at different $NH_4^+$ concentrations between 3 & 7 mM (pH $\sim$ 9.0-9.4). However, impedance spectroscopy (frequency: 0.1 to 100 kHz) measurements show that the frequency-dependent voltage-current phase angles shift with changing $[NH_4^+]$ (between 1 & 5 mM). The phase angle is constant at about 1.6 kHz with respect to different $[NH_4^+]$ (pH). For frequencies $>$ 1.6 kHz, the voltage-current phase angle increases at higher concentrations of $NH_4^+$ (higher pH) and for frequencies $<$ 1.6 kHz, the phase angle decreases with increasing $[NH_4^+]$. These changes in the ZnO nanobelt conductive properties are attributed to modification of electronic states at the nanobelt surface due to interaction between the ionic species and the nanobelt. These results demonstrate that the phase angle can be used as a unique parameter for quantification of different ion concentrations and ZnO nanobelt arrays can be used for detection of ionic species in aqueous environment, which can be employed for *in vitro* as well as *in vivo* sensing of biomolecules.

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