**Abstract**

Incorporation of reduced graphene oxide (rGO) modifies the properties of semiconducting metal oxide nanoparticles and makes it possible to tune the surface area and pore size to optimum values, which in turn improves their gas sensing properties. In this work, to improve the ammonia (NH3) gas sensing characteristics, reduced graphene oxide (rGO) was incorporated into tungsten oxide (WO3) nanospheres using a simple ultrasonication method. The rGO–WO3 nanocomposites exhibited porous nanosheets with nanospherical WO3 as observed with field-emission scanning electron microscopy (FE-SEM). The oxidation state of the rGO–WO3 nanocomposite was determined using X-ray photoelectron spectroscopy (XPS). Three ratios of (1, 5 and 10% rGO/WO3) nanocomposites and pure WO3 showed good selectivity towards NH3 at 10–100 ppm, and more remarkably at room temperature in the range of about 32–35 °C and at a relative humidity (RH) of 55%. The limit of detection (LOD) of the synthesized rGO–WO3 nanocomposites was 1.14 ppm, which will highly favour low detection ranges of NH3. The sensor response was 1.5 times higher than that of the bare WO3 nanospheres. The sensors showed excellent selectivity, ultrafast response/recovery times (18/24 s), reproducibility and stability even after one month of their preparation. We believe that metal oxides using the rGO modifier can improve the sensitivity and reduce the LOD towards NH3 and can be used effectively in real-time environmental monitoring.