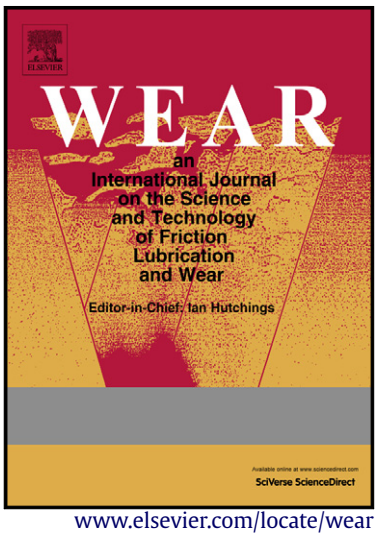

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Slurry pot investigation of the influence of erodant characteristics on the erosion resistance of titanium

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Induced ferromagnetic and gas sensing properties in ZnO-nanostructures by altering defect concentration of oxygen and zinc vacancies

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ABSTRACT

We report on the effect of the synthesis reaction-time on the structural, optical, magnetic and sensing properties of ZnO-nanostructures. Electron paramagnetic resonance and photoluminescence analyses revealed that singly ionized oxygen vacancies (V_O^+) and zinc vacancies (V_{zn}) are the main defects and that their relative concentration decreases with increasing particle sizes, resulting in decreased ferromagnetism (FM). Moreover, the sensing performance decreased with an increase in nanostructures synthesis reaction-time due to a decreased surface area, V_O^+ and V_{zn} concentrations. Thus, the synthesis reaction-time clearly controls the relative occupancy of the V_O^+ and V_{zn} present on the surface of ZnO-nanostructures, which enunciated to be critical for enhanced FM and sensing characteristics.

Keywords: ZnO; Ferromagnetism; Sensing

1. INTRODUCTION

The development of spintronic materials that combine both semiconducting and ferromagnetic properties has generated extensive interest due to their potential to provide new functionalities and enhanced performance in conventional electronic devices. Recent reports proposed the observation of ferromagnetism in semiconductor and insulating oxide nanostructures without doping despite their diamagnetic character in bulk form **[1-5]**.

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