**Vol. 13, No. 3, 2004**

# Combustion Synthesis of Zinc-Manganese-Sulfur Compound Systems

**H. Tanaka, E. Miyazaki and O. Odawara**

***Department of Materials Science and Engineering, Tokyo Institute of Technology, 4259 Nagatsuta, Midori-ku, Yokohama, 226-8502, Japan***

## ABSTRACT

The compounds of Mn-mixed ZnS as luminescent materials have been synthesized by a combustion synthesis technology using powder compacts with starting composition of (1-*x*)Zn+*x*Mn+*y*S (*x*≤0.05, *y*=1.1). The results of X-ray diffraction of products showed that only β-ZnS was identified even when the manganese ratio was maximum (*x*=0.05). The peaks of photoluminescent spectra of the products, however, shifted gradually from 480nm (x=0) to 580nm (*x*=0.05) with increase of added manganese. The peak at 480 nm was related to a self-activated (SA) emission, caused from some vacancies of $Zn^{2+}$ ions in the ZnS matrix, and that at 580nm was from $3d^5$ orbital transition of $Mn^{2+}$ ions. The present results indicated that $Mn^{2+}$ ions penetrated uniformly into the vacancies of $Zn^{2+}$ ions in ZnS matrix with increase of added manganese. As a result of the present work, it was confirmed that $Mn^{2+}$ ions could be distributed uniformly into the ZnS matrix following the additional ratio of manganese by the combustion synthesis technology.