



## MICROWAVE SYNTHESIS AND MAGNETIC PROPERTIES OF HIGH $T_c$ SUPERCONDUCTOR $MgB_2$

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Polycrystalline powders of  $MgB_2$  have been synthesized by microwave synthesis technique. Crystallographic information of the sample was investigated by powder X-ray diffraction (XRD). The main phase was determined as  $MgB_2$ , and secondary phases as  $MgB_4$  and  $MgO$ . The temperature dependence of magnetic properties of polycrystalline  $MgB_2$  have been characterized by SQUID magnetometer and X-band EPR spectrometer. The transition temperature to the superconducting phase is observed as 39K for both measurements. An isotropic, strong and very narrow EPR signal corresponding to free electron g-value ( $g_e=2.0023$ ) is observed. The observed line broadening with decreasing temperature might arise from the dipolar interactions between the superparamagnetic nanoparticles. Normally, the internal magnetic field originating from magnetic entities is expected to be more uniform as a result of highly ordered magnetic moments at low temperatures; giving narrower ESR line in contrary in our case. While the ESR line is broadened, the signal intensity is drastically decreased just below  $T_c=39$  K.