Abstract Submitted
for the MAR13 Meeting of
The American Physical Society

Infrared optical properties of Mn1.56Co0.96Ni0.48O4 thin films prepared by chemical solution deposition[1] YANQING GAO, ZHIMING HUANG, YUN HOU, JING WU, WEI ZHOU, LEIBO ZHANG, JUNHAO CHU, Shanghai Institute of Technical Physics — Mn1.56Co0.96Ni0.48O4 (MCN) films have been prepared on Al2O3 substrate by chemical solution deposition method. X-ray diffraction and microstructure analyses show a cubic spinel structure and the thickness of the films is 2.12 μm. Mid-infrared optical properties of MCN films have been investigated using transmission spectra and infrared spectroscopic ellipsometry. The transmission spectra can roughly be divided in two regions: a transparent oscillating one at longer wavelength and a strongly absorbing one for wavelength less than 2.2 μm. The optical band gap of the MCN film has been derived to be 0.64 eV by assuming a direct transition between valence and conduction bands. The optical constants and thickness of the thin films have been obtained by fitting the measured ellipsometric parameter data with classical infrared model. The refractive index n of the MCN films decreases as the wavelength increases, but the extinction coefficient k monotonously increases in the wavelength range of 2-7 μm. The maximal n value is 2.63, and the maximal k value is only 0.024. The above results are instructive for the applications of MCN films in infrared detecting.

[1]This work was supported by Shanghai Science Foundation (Grant No. 12ZR1452200 and 11ZR1442400), National Natural Science Foundation (No. 61274138, 61275111 and 11204336)

Yanqing Gao
Shanghai Institute of Technical Physics

Date submitted: 06 Nov 2012 Electronic form version 1.4