

## INTRODUCTION

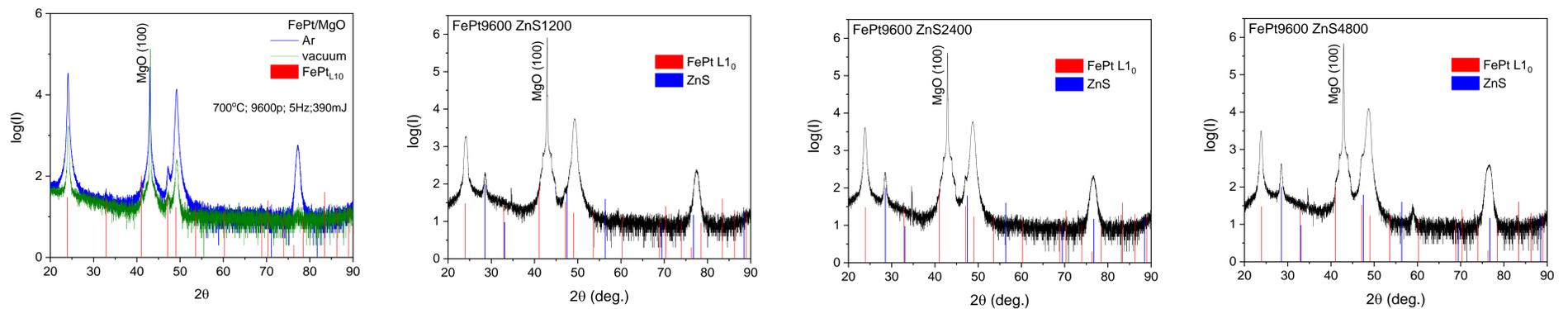
Ordered  $L_{10}$  FePt phase is a promising candidate for applications including biomaterials, permanent magnets, and spintronic devices of nanoscale devices due its large magnetocrystalline anisotropy. ZnS is chosen as an additive to prepare FePt films in order to further increase the degree of order and lower the annealing temperature.

## EXPERIMENTAL

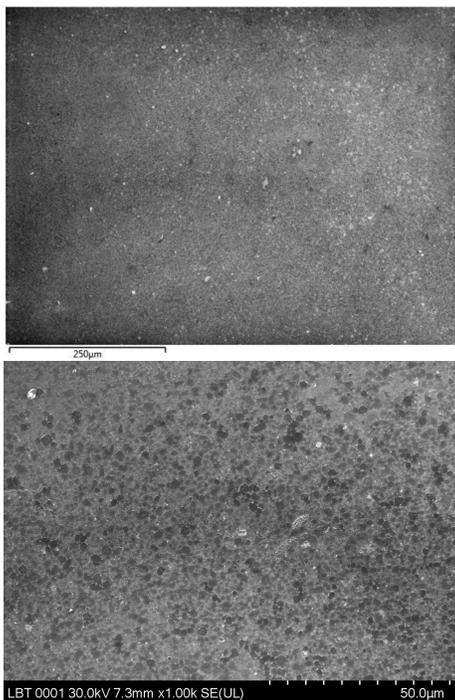
- ZnS/FePt thin films were grown on MgO (100) using PLD technique in different deposition conditions. The deposition parameters were for FePt:  $P=4.3 \times 10^{-2}$  mbar, Ar atmosphere,  $T=700^\circ\text{C}$ , 9600 pulses, 5 Hz. For ZnS the deposition parameters were:  $P=5.8 \times 10^{-2}$  mbar, Ar atmosphere,  $T=450^\circ\text{C}$ , 1200-2400-4800 pulses, 5 Hz.
- X-ray diffraction (XRD) measurements were made using a Rigaku - SmartLab automated Multipurpose X-ray Diffractometer .
- SEM Scanning Electron Microscopy was done using a HITACHI SU-8230.
- The magnetic properties were measured by SQUID MPMSXL magnetometer system.

## RESULTS

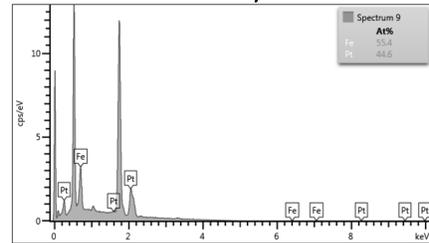
XRD diffraction pattern of FePt/MgO(100) and ZnS/FePt/MgO(100) thin films



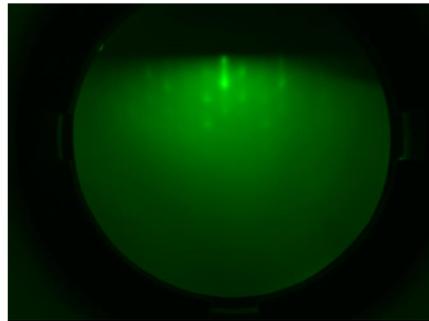
SEM analysis



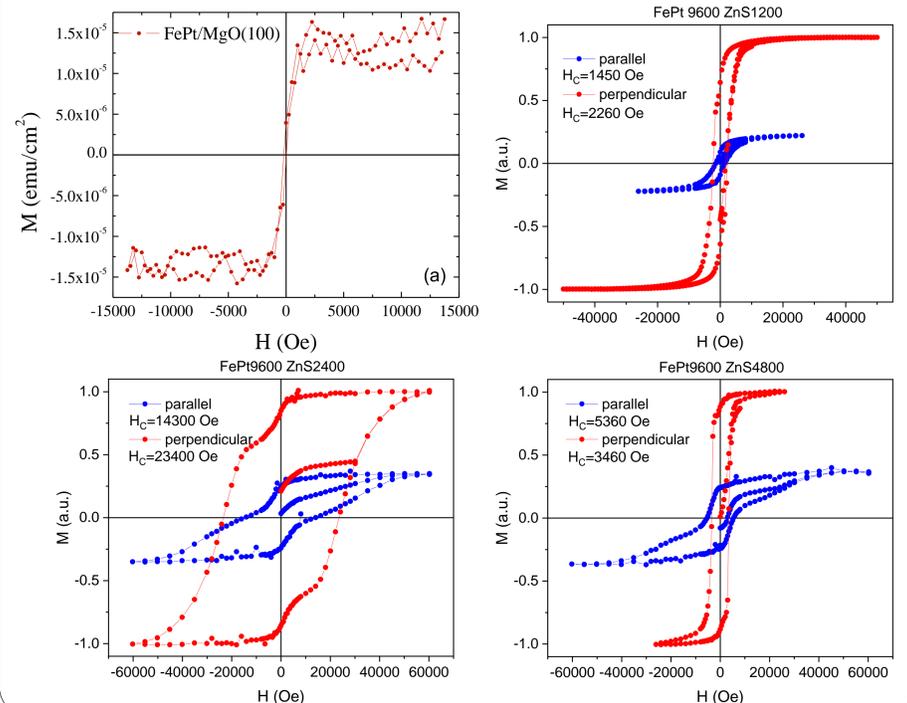
EDX analysis



RHEED analysis



Magnetization as a function of applied magnetic field of FePt/MgO(100) and ZnS/FePt/MgO(100) thin films



## CONCLUSIONS

- We have deposited a series of ZnS/FePt/MgO(100) thin films using PLD technique.
- Optimal parameters were identified in order to obtain ZnO/FePt/MgO(100) thin film without secondary phases. No diffraction peaks from other impurities are found within the detection limit.
- EDX analysis showed the deposition of a uniform layer of FePt with  $L_{10}$  composition.
- RHEED patterns are observed revealing an epitaxial growth of ZnS thin layer.
- The magnetic properties are influenced by the magnetic coupling between ZnS and FePt layers; the coercive field varies one order of magnitude from 2260 to 23400 Oe in case of out of plane configuration.
- The best deposition parameters were for FePt:  $P=4.3 \times 10^{-2}$  mbar, Ar atmosphere,  $T=700^\circ\text{C}$ , 9600 pulses, 5 Hz. For ZnS the best deposition parameters were:  $P=5.8 \times 10^{-2}$  mbar, Ar atmosphere,  $T=450^\circ\text{C}$ , 2400 pulses, 5 Hz.