Magnetostrictive Thin Film Galfenol for MEMS Applications

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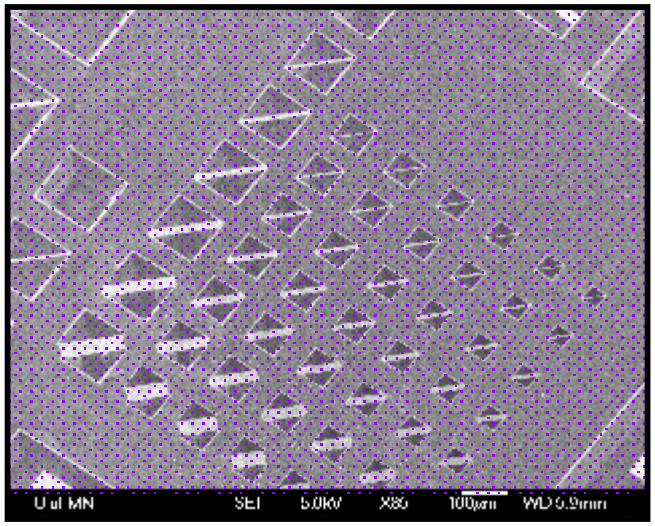
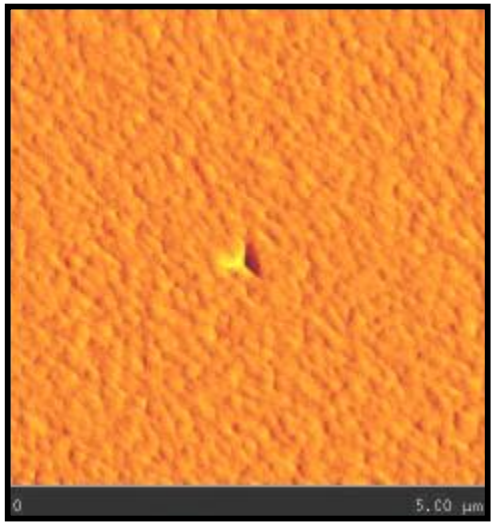
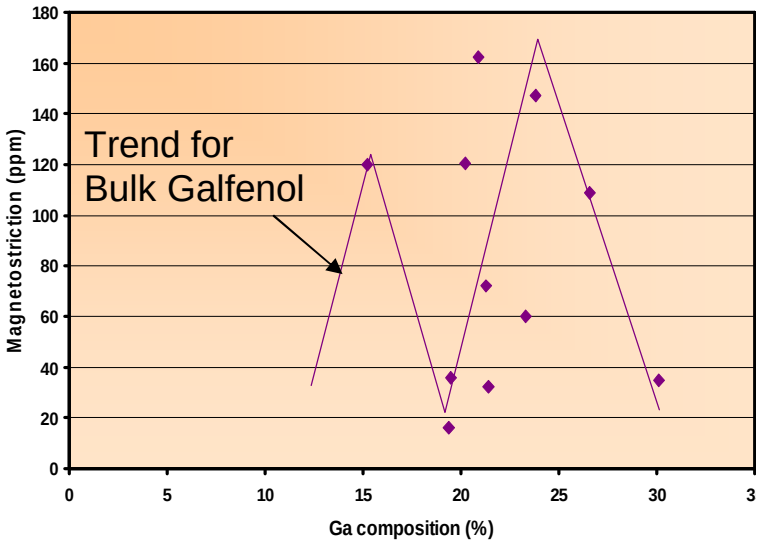
- Galfenol-coated Si_3N_4 double-clamped cantilevers
  - Beams were magnetically actuated
  - Applications will include microvalves, micropumps, MEMS sensors and actuators
- Mechanical Properties
  - First to measure hardness (5 – 9 GPa) and Young's Modulus (136 -187 GPa) of Galfenol thin films
  - Young's Modulus of thin films is higher than bulk values
- Magnetostriction
  - Measured magnetostriction up to 163 ppm
  - Double peak trend of magnetostriction versus %Ga is similar to bulk Galfenol







- Publications: R.R. Basantkumar, B.J.H. Stadler, R. William, E. Summers, "Sputtered Galfenol Thin Films," *IEEE Transactions on Magnetics* **42** 3102 (2006).