



NANOALLOYS

International Research Network



Comprendre le monde,
construire l'avenir®



9

Teams

170

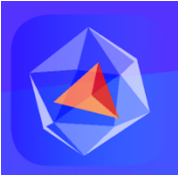
Members

110

PhD / PostDoc

250

Articles / year



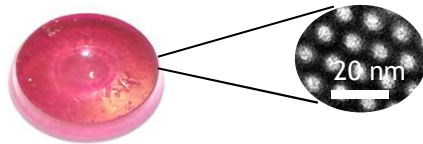
NanoAlloys Embedded in Sol-gel Oxide Matrices

A. Bleuzen, G. Fornasieri, L. Altenschmidt

Surfactant-assisted Sol-gel chemistry



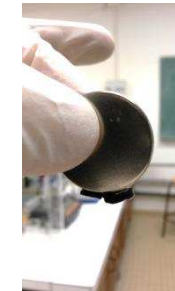
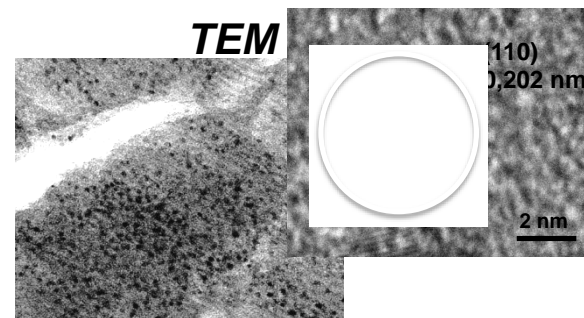
Ordered nanostructured
Film



Monolith

Alloy Nps with well-controlled size, chemical composition and spatial organization

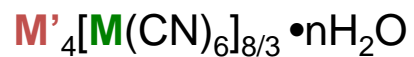
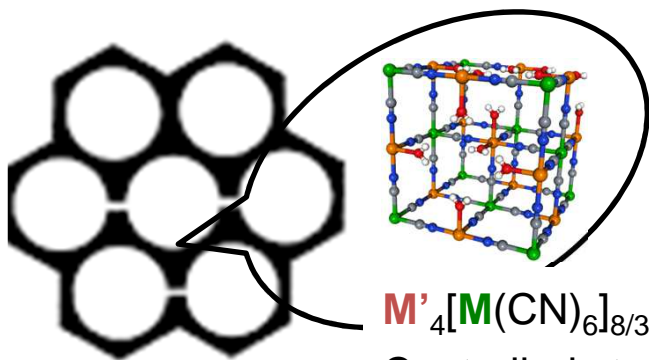
- SiO₂ monolith containing 5 nm CoFe Nps



Materials with enhanced collective magnetic properties

L. Altenschmidt *et al.*, Manuscript in preparation

Prussian blue analogs chemistry confined in the ordered porosity

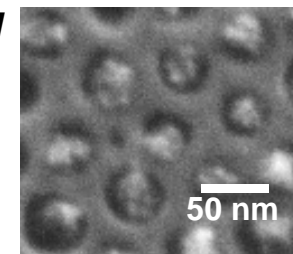


Controlled structure and
chemical composition

700° C Ar/H₂

- 50 nm CoFe NPs within the nanoporations of a TiO₂ film

SEM



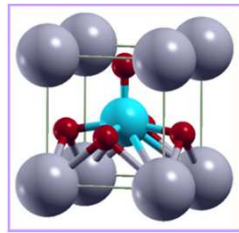
Towards high-density magnetic recording media



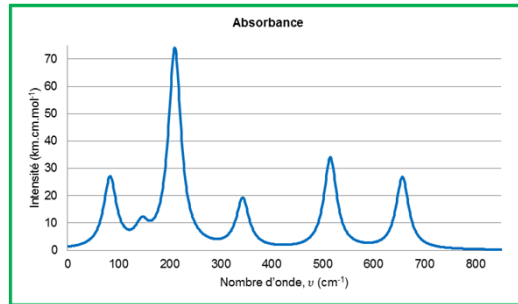
Numerical Simulations: Materials for piezoelectricity, thermoelectricity...

E. Amzallag, Y. Peperstraete, R. Tétot, J. Creuze

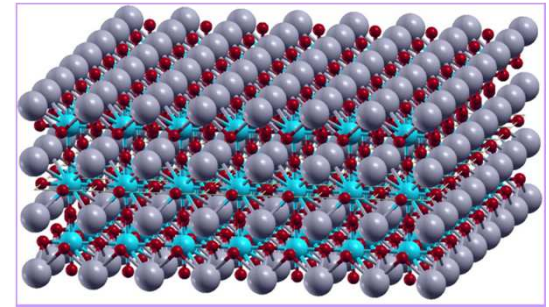
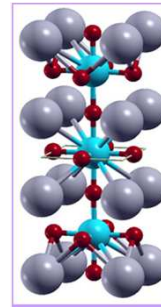
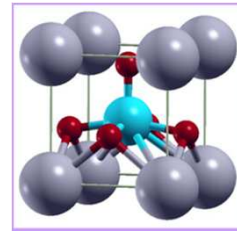
Comparison experiments/theory



PbXO₂

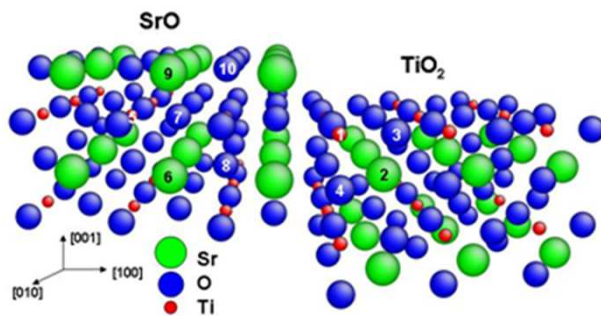


3D → Thin Film → ...

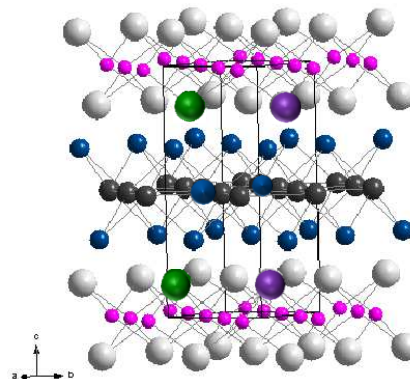


Ab initio calculations
SMTB-Q

2D



Influence of doping/defects

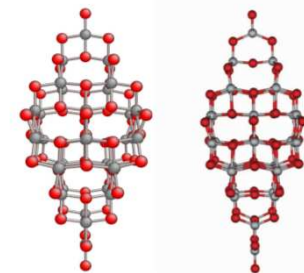


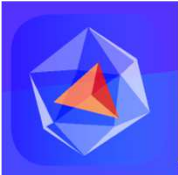
Bi → Sr

Bi → Ce

Se → Te

Influence of morphology





Numerical Simulations: Phase Transition, Interfaces and Nanostructures

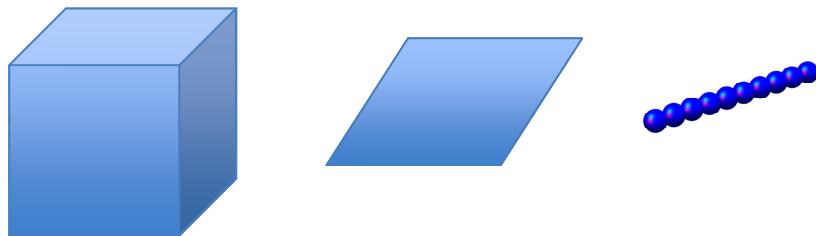
F. Berthier, J. Creuze, B. Legrand*

Influence of system

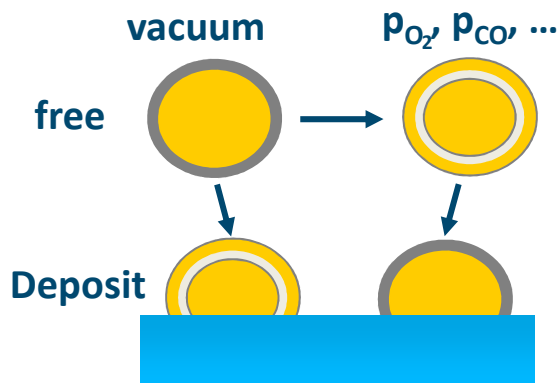
H																	He
Li	Be											B	C	N	O	F	Ne
Na	Mg											Al	Si	P	S	Cl	Ar
K	Ca	Sc	Ti	V	Cr	Mn	Fe	Co	Ni	Cu	Zn	Ga	Ge	As	Se	Br	Kr
Rb	Sr	Y	Zr	Nb	Mo	Tc	Ru	Rh	Pd	Ag	Cd	In	Sn	Sb	Te	I	Xe
Cs	Ba	La	Hf	Ta	W	Re	Os	Ir	Pt	Au	Hg	Tl	Pb	Bi	Po	At	Rn
Fr	Ra	Ac	Rf	Db	Sg	Bh	Hs	Mt	Ds	Rg	Cn	Uut	Uuq	Uup	Uuh	Uus	Uuo
		La	Ce	Pr	Nd	Pm	Sm	Eu	Gd	Tb	Dy	Ho	Er	Tm	Yb	Lu	
		Ac	Th	Pa	U	Np	Pu	Am	Cm	Bk	Cf	Es	Fm	Md	No	Lr	

Demixion / Order

3D → 2D → 1D



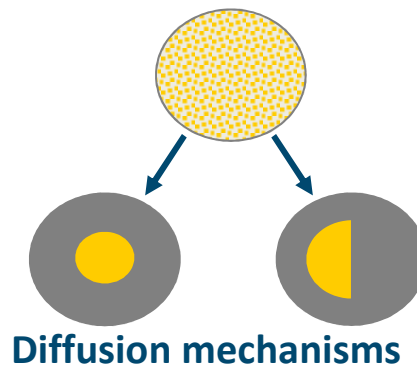
Influence of environment



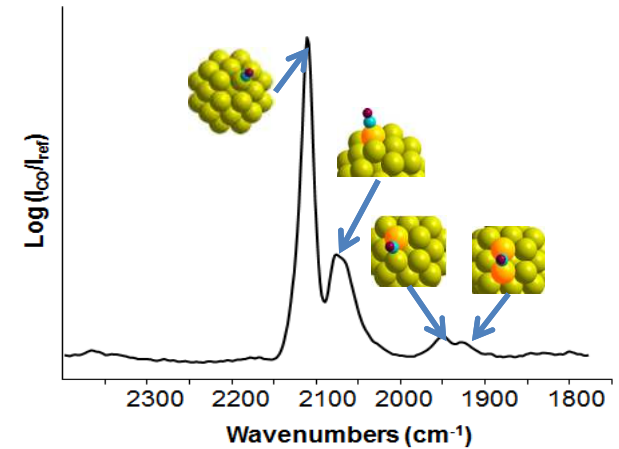
Off-Lattice/Rigid Lattice
Monte Carlo
Simulations

(Kinetic) Mean Field

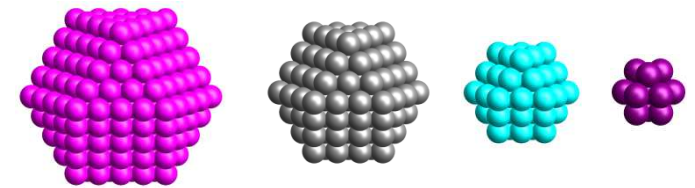
Ageing



coupling experiments/theory



Influence of size ...



... and morphology

