

Effects of substitution of Manganese in electron-doped manganites

Presented by Uwe Amann



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Uwe Amann: Manganese Substitution in electron-doped manganites

EBERHARD KARLS
UNIVERSITÄT
TÜBINGEN



Electron-doped manganites

General formula: $AMnO_3$

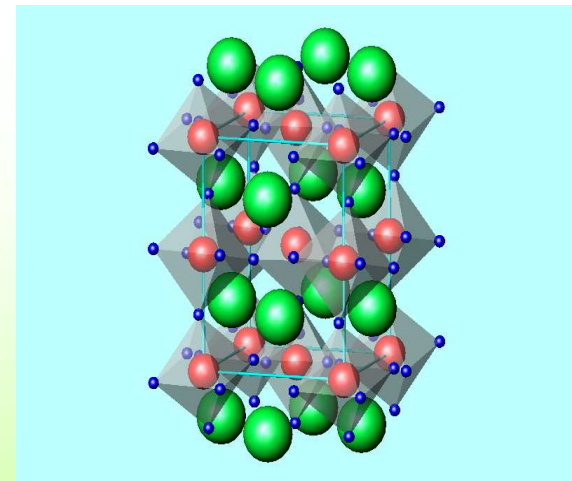
For example: $YMnO_3$, $HoMnO_3$,
 $LaMnO_3$, $CaMnO_3$

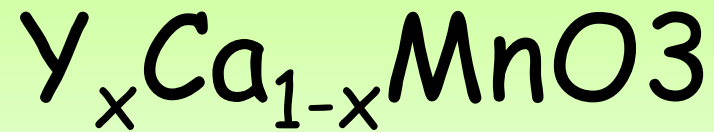
→ hexagonal

→ orthorhombic

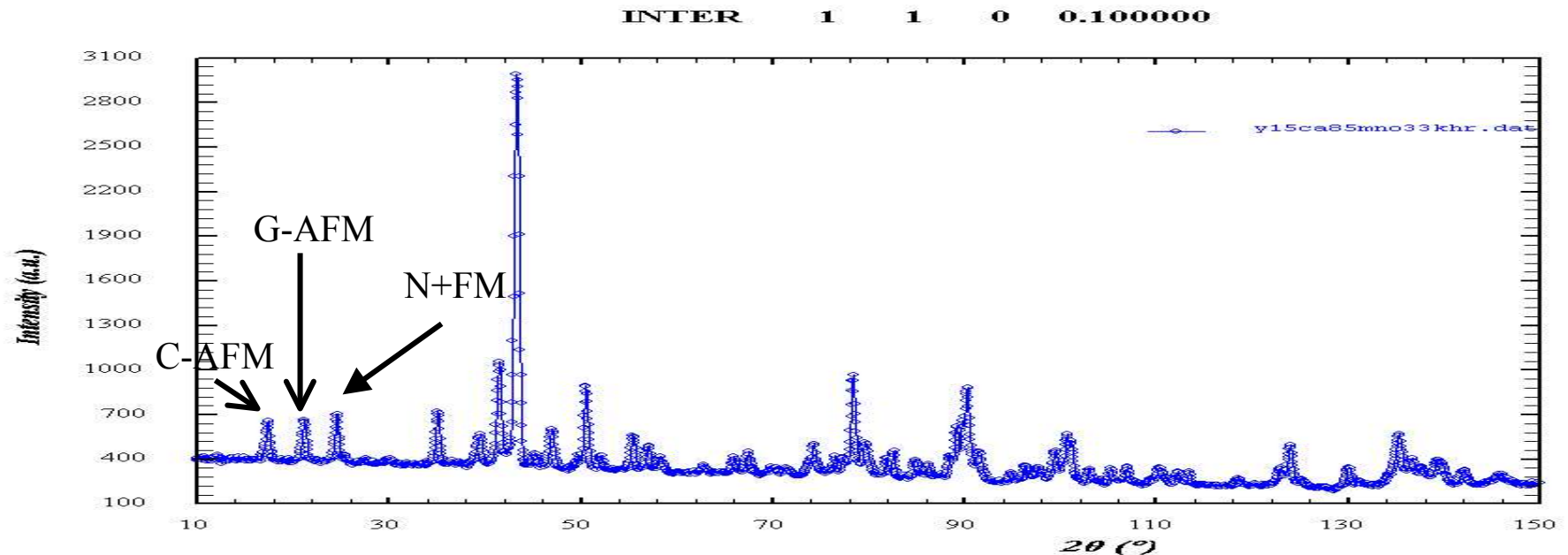
$CaMnO_3$

- G-type Antiferromagnet, SG Pnma
- Pure Mn^{4+}
- Y-doping introduces additional electrons:
 - Mixed valent Mn^{3+}/Mn^{4+} , CMR
 - Nuclear Structure doesn't change but magnetism & conductivity





- FM vs. AFM interaction leading to Canted G-AFM
- Additional monoclinic C-AFM phase for $x > 0.08$



Manganese substitution

by other trivalent ions: Fe^{3+} , Ga^{3+}

Effects:

- Shift in phase transition temperature
- Strength of ordered magnetic moments

And changes in other
physical properties

Goals:

- Tuning of physical properties: conductivity, phase transition temperature
- Understanding of physical mechanism



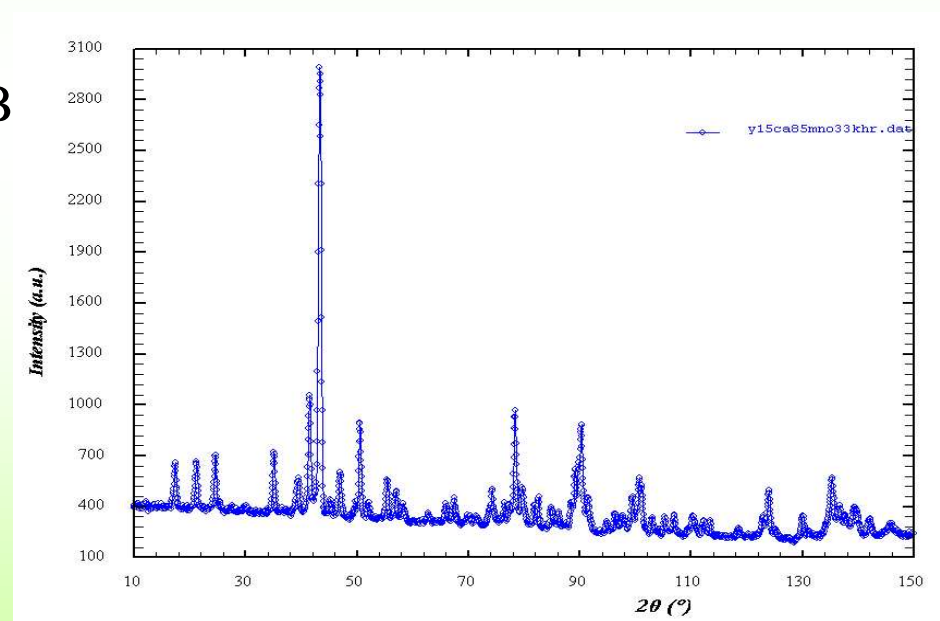
Methods

Neutron Diffraction

Nuclear and magnetic structure

High resolution measurements on D2B

- Lattice parameters
- Bond angles and distances

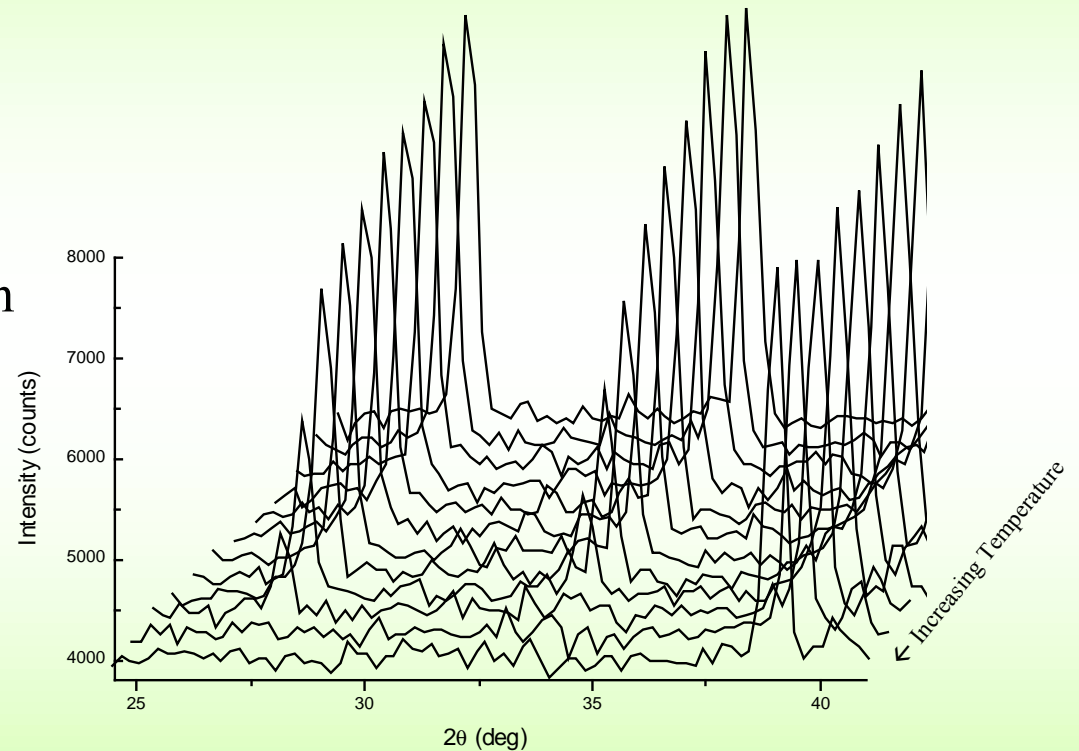


Methods

Neutron Diffraction

Temperature dependant evolution
of the magnetic structure

D1B



Only every fifth scan shown!



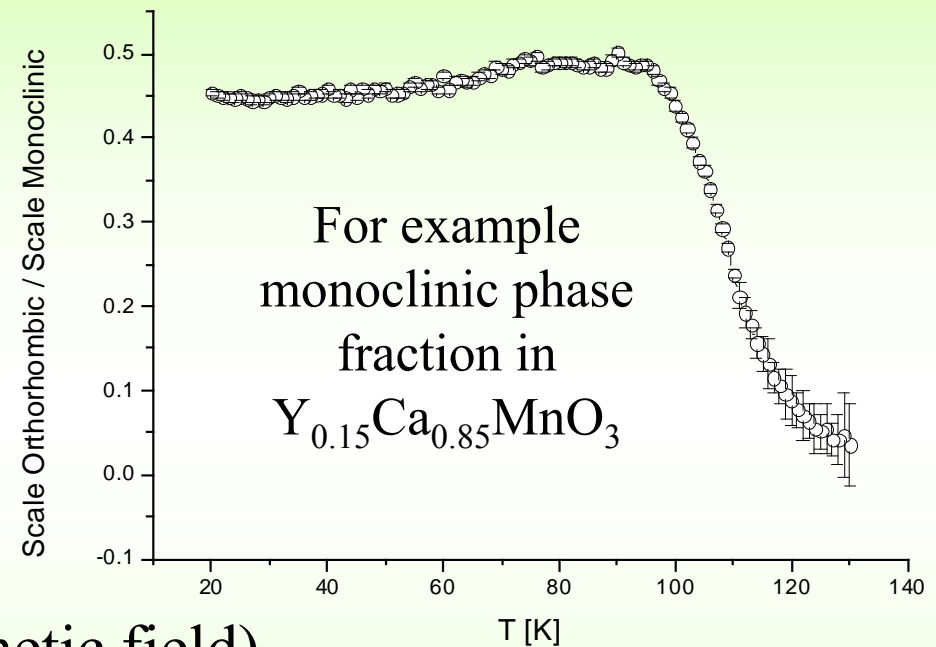
Methods

X-ray diffraction

Temperature dependant structure

Physical methods

- Electrical transport (in magnetic field)
- Magnetization measurements (SQUID)



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Thank you for your attention!

