



The 2006 Fall Meeting Chairs of the Materials Research Society

hereby present

Sujeet Chaudhary

with this certificate for the

Outstanding Poster Award

Bestowed in recognition of the recipient's presentation of poster K10.1 judged superior in technical content, appearance, graphic excellence and presentation quality.

A handwritten signature in dark ink, appearing to read 'Babu Chalamala', written over a horizontal line.

Babu Chalamala

A handwritten signature in dark ink, appearing to read 'Louis J. Terminello', written over a horizontal line.

Louis J. Terminello

A handwritten signature in dark ink, appearing to read 'Helena Van Swygenhoven', written over a horizontal line.

Helena Van Swygenhoven

10.1
Subject
Chaudhary



FERROMAGNETIC ORDERING AT ROOM TEMPERATURE IN ZnO:Co NANOPARTICLES

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Introduction

Prospects of ZnO in SPINTRONICS

SPINTRONICS=SPIN based elecTRONICS

Advantages of Spintronic Devices:

- Freedom of freedom, CHARGE and SPIN of carriers
- Storage on the SAME MATERIAL
- Information can be controlled ELECTRONICALLY or MAGNETICALLY (i.e., Integrated magnetic, electronic and spintronic device)
- NON-VOLATILE semiconductor memory
- Less power consumption LESS POWER and would have higher performance

Requirements for Spintronic M

- Intrinsic room temperature ferromagnetism
- High spin-polarized transport

Possible Materials

- Ferromagnetic Semiconductors
- Ferromagnetic alloys
- Half metallic oxides

Advantages

- Expected to be ferromagnetic at room temperature
- RTFM can be stabilized by Co doping
- Solubility limit of 3% Co in ZnO
- ZnO: Co piezo-electric region
- Induction of ferromagnetism in ZnO
- multifunctional device

Important

Is RTFM in ZnO due to presence of Co?

Acknowledgement

Preparation

Thin film samples prepared by

radio-frequency sputtering of ZnO:Co target

on Si substrate

at 600°C for 1h and pelleted

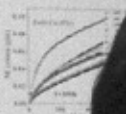
pellets were sintered at 600, 700, 800, 900 and

two steps of 1h each and characterized at

RT.

Effect of sequential sintering

Room data of ZnO:Co (5%)



Room data of ZnO:Co



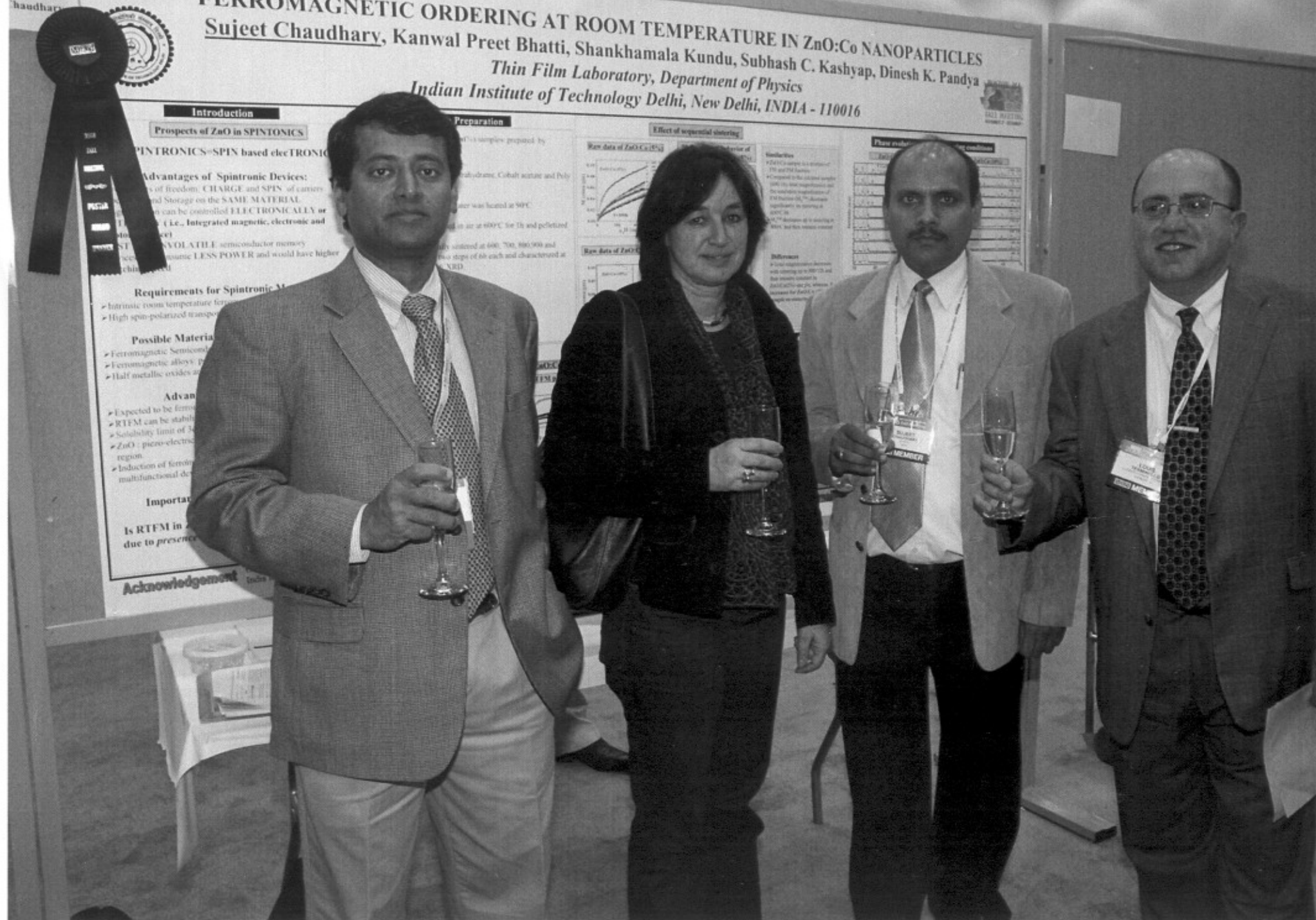
Conclusion

- ZnO:Co samples show ferromagnetic behavior at room temperature
- Compared to the sintered samples (900°C) the room temperature magnetization of ZnO:Co (5%) decreases significantly as sintering temperature decreases
- The decrease of magnetization with decreasing sintering temperature is attributed to the presence of Co in ZnO

Difference

- Local magnetization decreases with increasing sintering temperature and the magnetization of ZnO:Co (5%) increases as sintering temperature increases

Please evaluate the presentation





**Materials
Research
Society**

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2006 FALL MEETING:

**November 27 –
December 1**

Hynes Convention Center
and Sheraton Boston Hotel

Boston, Massachusetts

December 20, 2006

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Congratulations!

Enclosed is an official certificate to commemorate your receipt of a "Best Poster Award" from the Chairs of the 2006 Fall Meeting of the Materials Research Society. Also included is a photograph of the celebration ceremony. Pictured with you in the photograph are 2006 Fall Meeting Chairs Helena Van Swygenhoven and Louis Terminello.

Please accept these items along with our sincere gratitude for helping to make the poster sessions at the Fall Meeting a resounding success.

Sincerely,

Richard D. Stevens
Meetings Manager

Enclosure