## FA5-MS39-P12

**A Study on Marble Dust Nanocompozites.** E. H. Soylu[a], Semra İde[b], Sevgi Bayarı[c], Engin Traşoğlu[a], Hüsnü Aksoy[d], [a]*Kradeniz Technical University, Faculty of Science & Literatur, Department of Physics 61080, Trabzon, Turkey,* [b]*Hacettepe University,Faculty of Engineering, Department of Physics Engineering 06800 Beytepe- Ankara, Turkey,* [c]*Hacettepe University, Department of Physics Education, 06800 Beytepe-Ankara, Turkey,* [d]*Hacettepe University, Department of Geology Engineering06800 Beytepe- Ankara, Turkey*
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The big amount (20%) of a marble block becomes marble dust waste during production and manufacturing operations in our country (which has approximately 40% marble reserves of the world). The aim of our research is creating an opportunity to evaluate these waste materials to gain better possibilities in our own scientific, economic, technological and environmental conditions.
In this study, pioneering works of our Scientific and Technological Research (TUBITAK) Project which titled " A research on novel nano composites prepared with marble powder: composite synthesis, structural analysis, mechanical and antimicrobial properties" has been done. To examine the realization of this project, we communicated with an organization which is producing kitchen building materials defined by polymer-based micro marble powder composites. The different nanocomposites (including 3%, 5%, 10% zirconium and titanium nano powders) have been prepared in the workshop of this organization operating in Eskişehir-Turkey. Thus, the non-toxic and mechanically advanced metarials have been tried to compose.
Suitable, cylindrical molds for mechanical tests were prepared and mechanical tests (Strain –Stress measurements) were made in Geology Department of our University. Already used, pre-manufactured kitchen sink parts, the materials which are used in the preparing process and different marble dusts were examined by using SWAXS methods. Beside of the nanostructural analysis, FT-IR and XRF studies were also carried out to explain the molecular structures of the samples' contents. At last, the correlation between the identified mechanical properties and structural information has been investigated.
The more systematical and detailed researches will be done in the content of the above mentioned Project.

**Keywords: SWAXS, FT-IR, XRF, marble dust, nanocomposites**

## FA5-MS39-P13

**GISAXS analysis of the precipitates in GeMn thin layers.** Vaclav Vales[a], Vaclav Holy[a], Rainer T. Lechner[b]
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GeMn alloys have attracted much attention because of their magnetic semiconductor behaviour and their possible use in spintronic devices [1]. It is known [2] that the magnetic properties of such GeMn epitaxial layers are essentially influenced by inhomogenities of Mn atoms in the surroundning lattice. According to the deposition parametres either cubic, coherent Mn-rich clusters or incoherent, precipitates consisting of the hexagonal intermetallic $Mn_5Ge_3$ phase can occur in a defect free, diamond lattice of Ge matrix. We have studied a series of GeMn thin layers prepared by molecular beam epitaxy prepared under different conditions (Mn content, substrate temperature, growth rate) by grazing-incidence small angle x-ray scattering. By fitting of the measured maps using our simulation program we obtained parameters of the precipitates such as the size and orientation of the particles, the correlation of their mutual positions and parametres of the surface roughness.

[1] D. Bougeard, N. Sircar, S. Ahlers, V. Lang, G. Abstreiter, A. Trampert, J. M. LeBeau, S. Stemmer, D. W. Saxey, and A. Cerezo, *Nano Letters*, 2009, 9, 3743-3748. [2] V. Holy, R. T. Lechner, S. Ahlers, L. Horak, T. H. Metzger, A. Navarro-Quezada, A. Trampert, D. Bougeard, and G. Bauer, *Phys. Rev. B*, 2008, 78, 144401.

**Keywords: GeMn, GISAXS, precipitates**

## FA5-MS39-P14

**Influence of Si-doping on structure in InAs nanowires.** Martina von der Ahe[a], H. Hardtdegen[a], K. Sladek[a], A. Penz[a], F. Dorn[b], A. Heiss[b], T. Weirich[b,c] and D. Grützmacher[a], [a]*Institute of Bio- and Nanosystems, Forschungszentrum Jülic, Germany,* [b]*Central Facility for Electron Microscopy, RWTH Aachen University, Germany,* [c]*Institute of Crystallography, RWTH Aachen University, Germany*
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InAs nanowires have received considerable attention for their application in future generation high speed electronic devices since a high conductivity is expected due to the material`s narrow bandgap and the low carrier effective mass. Nevertheless, nanowires produced by a bottom up epitaxial growth process – here selective area metalorganic vapor phase epitaxy - exhibit a much lower conductivity than wires of a similar dimension which have been etched from bulk InAs material. The reason may be that stacking faults in the grown wires are responsible for this undesired effect [1]. In this contribution we report on an experiment in which the attempt was made to alter the number of stacking faults by doping the wires with Si in a range up to 1.6 E20 $cm^{-3}$. Subsequent characterization of the wires was carried out by transmission electron microscopy (TEM) on thin lamella prepared by focussed ion beam (FIB) machining. The results of the present investigation show, that doping clearly has an effect on the structure of the wires.

[1] S. A. Dayeh, C. Soci, X.-Y. Bao and D. Wang, Nano Today, 2009, 4, 347-358.

**Keywords: nanowires, III/V semiconductors, TEM**