## FA5-MS06-P01

**X-ray Scattering and Diffraction Studies on Spider Silk Cocoons.** Elif Hilal Soylu[a], Semra Ide[b], Tuncay Turkes[c], Neslihan Kocatepe[d], Orhan Mergen[d], Omer Celik[e]. *[a]Karadeniz Technical University, Faculty of Science & Literature, Department of Physics, Trabzon -Turkey. [b]Hacettepe University, Fac. of Engineering, Dept. of Physics Eng. 06800 Beytepe-Ankara, Turkey. [c]Nigde University, Faculty of Science, Department of Biology, Nigde-Turkey. [d]Hacettepe University, Faculty of Science, Department of Biology, 06800 Beytepe-Ankara, Turkey. [e]Harran University, Faculty of Science and Art, Dept. of Physics, 63300 Sanlıurfa, Turkey.*
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A spider can produce several types of silk (dragline, cocoon, etc.) which is a composite material with a hierarchical structure. This structure includes beta-sheet, polypeptide chain network and silk fibril. If the design of these bio-based materials and the relationships between protein sequence and structure-property are understandable, this knowledge can be used in technological applications ranging from medical (micro-sutures, artificial ligaments, tendons, and drug delivery coatings) to military (body armor, light weight gear) to civilian (textiles) usages [1-3].
The purpose of this study is to characterize the structure of silk cocoon samples which have high crystalinity and valuable protein contents. X-ray powder diffraction and SWAXS (Small and Wide Angle X-ray Scattering) methods were used for the structural characterizations. ARANEIDAE (Simon, 1895) and GNAPHOSIDAE (Pocock, 1898) families have been especially studied because of their productive properties. The crystallite size range, crystallinity percentages, number of crystallites and the distances between crystallites (depending on the direction of fibrils) have been determined. The results have been systematically evaluated and recorded as database for our ongoing TBAG project [4].

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**Keywords: SWAXS; XRD; spider silk cocoon**

## FA5-MS06-P02

**Preperation and Characterization of Novel Wood Nanocomposites.** Semra Ide[a], Elif Hilal Soylu[d], Didem Rodoplu[c], Seyda Kucukyildiz[a], Gokce Sen[a], Salih Aslan[b], Sadan Ozcan[a], Musa Mutlu Can[a]. *[a]Hacettepe University, Department of Physics Engineering/ 06800 Beytepe-Ankara-Turkey. [b]Hacettepe University, Division of Wood Products Industrial Engineering/ 06800 Beytepe-Ankara-Turkey. [c]Hacettepe University, Institu of Pure and Applied Sciences, Nanotechnology and Nanomedicine Division/ 06800 Beytepe-Ankara-Turkey. [d]Karadeniz Technical University, Faculty of Science & Literatur, Department of Physics/ 61080 Trabzon-Turkey.*
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Although wood is durable and strong as natural materials, it can be easily degraded under external effects in our daily life. Physical properties of wood materials such as transparent, flexible, wear-resistance, UV-protector, heat and cold insulator etc., have big importance in technological developments. Especially in nanotechnological investigations, their superior performance under different conditions and water repellent properties attracts much attention [1-5]. In this study, Small and Wide Angle X-ray Scattering (SAXS and WAXS) methods were used to characterize the natural structures of poplar (populus), hornbeam (carpinus), chesnut (castanea) and walnut (juglans) trees originally form Turkey forests and their micropowders of aspen heartwood and aspen sapwood parts. After first structural comparisons , their micropowder forms, metal oxide nanopowders (aluminium, cobalt, nickel oxide etc., size range ~ 10-20 nm) and kleiberit 303 (as PVAC base adhesive) were mixed and the new substances were typically stirred for 30 min-120 min to prepare cylindirical and planar shaped nanocomposite hardboards. As secondary part of the study, SWAXS measurements have been performed for wood nanocomposites to determine the shape and distributions of nanosized aggregation. Pair distance distributions and size distributions were obtained and compared to prepare homogenous samples. Beside of these studies, moisture contents, thickness swelling of the samples and mechanical properties (strain and stress) were also determined.
Acknowledgement: Authors thank Hacettepe Univ. Scientific Research Unit for the support in the project no: 06A602012

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**Keywords: wood; nanocomposites; SWAXS**

## FA5-MS06-P03

**Novel Bone Nanocomposites: Preperation, FTIR and SWAXS Analysis.** Sevgi Bayari[b], Semra Ide[a], Elif Hilal Soylu[c], Didem Rodoplu [a], Tuna Vargı [a], Atila Yoldas[d]. *[a]Hacettepe University, Department of Physics Engineering-Institu of Pure and Applied Sciences, Nanotechnology and Nanomedicine Division 06800 Beytepe-Ankara, Turkey. [b]Hacettepe University, Department of Physics Education, 06800 Beytepe-*