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INSTITUTO DE FÍSICA APLICADA E ENGENHARIA DE MATERIAIS
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IAPME Seminar

Fabrication of high-conductivity SWCNT fibers and their non-woven fabrics

Prof. Chang LIU

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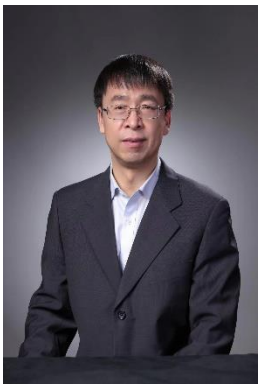
Date: 13/12/2023; Time: 11:00 – 12:00; Venue: N23-4018

Single-wall carbon nanotubes (SWCNTs) with unique tubular one-dimensional structure and excellent physiochemical properties are considered an ideal building block for the assembly of high-performance with a wide range of applications. We prepared high-quality SWCNTs by a floating catalyst CVD method. Under optimum conditions, the conversion rate of the carbon source to SWCNTs reached 28.8%, and the as-prepared SWCNTs had a purity higher than 96 wt.%. Using the as-prepared high-quality SWCNTs, we spun macroscopic SWCNT fibers with diameters of 10-20 microns by a wet-spinning process. The resulting fibers had a high electrical conductivity of 6.67×10^6 S/m. We further prepared a SWCNT/Cu core-shell fiber by a combined magnetron sputtering and electrochemical deposition method, which showed an ultra-high specific electrical conductivity of 1.15×10^4 S m^2 Kg-1, 56% higher than Cu. A strong connection of the SWCNT fiber with a copper substrate was realized by soldering. We fabricated a SWCNT fiber non-woven fabric, which showed a high electrical conductivity and excellent electrothermal property.



Prof. **Chang LIU** is a professor at the Shenyang National Laboratory of Materials Science, Institute of Metal Research, Chinese Academy of Sciences. He received his Ph.D. in materials science at IMR, CAS in 2000. During 2004-2005, he worked at the International Center for Young Scientists, National Institute for Materials Science, Japan as a research fellow. His current research interest focuses on the preparation, properties and applications of carbon nanotubes and their composites. He has published more than 200 peer-reviewed papers with more than 18000 citations. He has authorized more than 60 patents and has given more than 50 invited talks in international/domestic conferences. He is currently an editor of Carbon and associate editor of Nano Materials Science.

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