3rd ICQMT 2025

3rd International Conference on Quantum Materials and Technologies

REBCO-based, Coated Conductors for Large-scale HTS Applications

Distinguished Professor
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- Member, National Materials & Manufacturing Board (NMMB)
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Date and Time:
From 26 April to 3 May 2025, exact day&time will be announced later.

Lecture Room:
TBD

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10th ICSM 2025

10th International Conference on Superconductivity and Magnetism

Abstract

An overview as well as the current status related to commercialization of three platform technologies – (1) Rolling-Assisted-Biaxially-Textured Substrates; (2) LMOe-enabled IBAD MgO Substrates technology, for fabrication of kilometer-long HTS wires and (3) Phase Separation and Strain-driven Self-Assembly technology for creating controlled nanostructures in kilometer-long wires will be presented. Most companies world-wide, fabricating long-length of coated conductor-based, HTS wires, use one or more of these platform technologies for fabricating the high-performance, single-crystal-like HTS wires. These kilometer-long, coated conductor-based, HTS wires are now enabling many large-scale applications such as commercial nuclear fusion for energy generation as well as numerous other large-scale applications in the electric power industry.

Engineered nanoscale defects within REBa2Cu3O7-δ (REBCO) based coated conductors are of great interest for enhancing the performance via vortex-pinning, especially in high-applied magnetic fields. We have previously reported excellent transport Jc's and flux-pinning in YBCO films with self-assembled BZO columnar defects in the entire operating temperature regime from 4.2-77K via correlated pinning from extended defects at mid to higher operating temperatures as well as collective pinning from oxygen point defects arising due to the local strain near YBCO/BZO interfaces at lower operating temperatures. We will present results on our recent work to probe the limits of critical current density possible via defect engineering via transport measurements of critical current density, Jc, and pinning force, Fp, in coated conductors fabricated using pulsed laser ablation. We will also provide a one-to-one comparison of transport Jc and magnetic Jc as a function of applied-field from low (4.2K) to high (77K) operating temperatures of optimized coated conductors.

Further information: can be found:

University Page

"Initiative for Plastics Recycling Research and Innovation" Web Page

Wikipedia Page

Biography

AMIT GOYAL is a SUNY Distinguished Professor and SUNY Empire Innovation Professor at the State University of New York (SUNY) at Buffalo. He is an Emeritus Corporate Fellow at the Oak Ridge National Laboratory. Goyal was previously a UT-Battelle Corporate Fellow, a Battelle Distinguished Inventor and an ORNL Distinguished Scientist at Oak Ridge National Laboratories in Tennessee.

He is a leading scientist in the field of advanced energy and electronic materials, including High Temperature Superconductors. He has co-authored over 360 publications and has 88 issued patents. He has received numerous accolades including the presidential level DOE's E. O. Lawrence Award in the inaugural category of Energy Science & Innovation. The US Department of Energy (DOE) Secretary on behalf of the President of the United States bestows the award. He is a Member of the US National Academy of Engineering (NAE) and the US National Academy of Inventors (NAI). He is a Fellow of AAAS, MRS, IEEE, APS, ASM, ACERS, IOP, WIF and WTN. Selected additional honors include: TEN R&D 100 awards which are widely regarded as the "Oscars for Innovation" as well as the R&D Magazine's "Innovator-of-the-Year" award in 2010 for sustained innovations. Selected additional honors include: TEN R&D 100 awards which are widely regarded as the "Oscars for Innovation" as well as the R&D Magazine's "Innovator-of-the-Year" award in 2010 for sustained innovations. He is also a Member of the US National Materials & Manufacturing Board (NMMB) and has served on numerous National Academy Committees for reviewing national initiatives and developing national plans in various areas.

He is the Director of the Laboratory for Heteroepitaxial Growth of Functional Materials & Devices as well as the Director of the NYS Center of Plastics Recycling Research & Innovation at the University. Previously he served as the Founding Director of the University-wide, multidisciplinary RENEW (Research & Education in Energy, Environment & Water) Institute cutting-across seven schools and colleges. In recognition of extraordinary service to the university, he was awarded the UB President's Medal, the highest recognition awarded at the University.