DR. ALI DHINOJWALA

H.A. Morton Professor of Polymer Science

Adhesion and Interfacial Science

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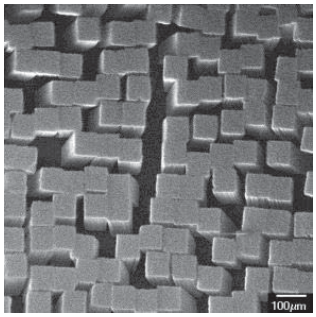
Biography: Ali Dhinojwala is H.A. Morton Professor of Polymer Science at The University of Akron. He obtained a Ph.D. in Chemical Engineering from Northwestern University and spent two years as a research scientist at University of Illinois at Urbana-Champaign. After spending one year at GE Plastics, Dr. Dhinojwala joined The University of Akron in 1997. His current research is in the areas of adhesion, friction, and wetting. His group has developed unique surface technique to study buried polymer interfaces. His recent interest is in understanding how geckos and spiders use adhesives for locomotion and prey capture. These studies have led his team to develop synthetic adhesives using aligned carbon nanotubes.

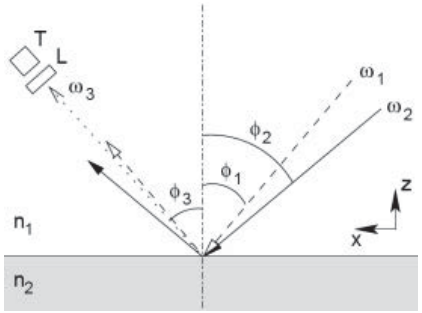
Awards/Accomplishments:

- 3M Young Faculty Award
- NSF Creativity Award
- CAREER Award given by The National Science Foundation
- Omnova Signature University Award
- Outstanding Researcher of the Year, University of Akron
- Whitby Award for Teaching and Research from the Rubber Division

Bio-Inspired Adhesives and Coatings:

Insects, spiders, and geckos use brushes of micron or nanometer-size hairs for locomotion or catching preys. Materials inspired by nature can offer solutions to design dry adhesives, self-cleaning surfaces, and coatings. Dr. Dhinojwala and his collaborators in Integrated Biosciences study the basic principles governing gecko and spider adhesion and they use these concepts to develop synthetic adhesives and coatings. He has patents in carbon nanotube-based adhesives and coatings for thermal management.





Surface-Sensitive Sum Frequency Generation Spectroscopy (SFG):

In adhesion, coatings, catalysis, cell biology, and biomedical implants, there are problems that involve the coming together of two immiscible substances. Observable interfacial phenomena are dictated by the nature and organization of molecules at the interface. The Dhinojwala laboratory has developed SFG technique to study polymer-air, polymer-liquid, polymer-polymer, and polymer-solid interfaces, and uses this approach to understand problems related to adhesion, friction, and wetting.

Industrial Sector Focus:

Dr. Dhinojwala has ongoing collaborative work with Lubrizol, Exxon Mobil, GE, BD, Bemis, Coloplast, Avery Dennison, and Army Research Laboratory. His past collaborators include GOJO, 3M, Parker-Hannifin, Ohio Willow Wood, and OMNOVA, Dhinojwala has a joint NSF-GOALI grant with GE on understanding ice-adhesion next to solid surfaces. His laboratory has developed unique instrumentation to study freezing of water next to polymer and solid surfaces.

Unique Laboratory Facilities:

Instrumentation to measure surface structure of polymers using surface-sensitive sum frequency generation spectroscopy. Growth of carbon nanotubes and characterization of thermal interface materials. Instrumentation to measure dry and wet interfacial adhesion and friction.

Recent Publications/Patents:

https://blogs.uakron.edu/dhinojwala/