



IBS Center for Multidimensional Carbon Materials



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Strength and Wettability of Graphene and Graphene Composites

Feb 7 | Bldg. 101
Wed 2 PM | Seminar Room on the 1st floor

Abstract: Understanding mechanical properties of materials is crucial for the design of mechanically reliable devices and for the utilization of microstructure-dependent or strain-induced properties. I will present the recent research activities in our lab on the graphene and graphene composites regarding the strength and wettability of graphene and graphene composites. Specific topics include (i) feasibility of measuring the strength of 2D materials with nanoindentation, (ii) mechanical properties of metal-graphene nanolayered composites, (iii) wettability control of graphene-coated substrate by mechanical strain or electric field. I will briefly introduce other research activities in the lab on the homogenization theory for effective mechanical and thermal properties of composites, the fundamental theory of wetting, and theoretical/computational studies of nacre-inspired composites.

Reference:

- [1] B. Hwang, *et al.*, **Nano Letters** 17, 4740 (2017)
- [2] R. Tabassian, *et al.*, **Nature Communications** 7, 13345 (2016)
- [3] D. Kim, *et al.*, **Scientific Reports** 5, 15526 (2015)
- [4] J. Han, *et al.*, **Nanoscale** 7, 15672 (2015)
- [5] J. Zang, *et al.*, **Nature Materials** 12, 321 (2013)

Seunghwa Ryu (유승화|柳昇和) is an associate professor of mechanical engineering at Korea Advanced Institute of Science and Technology (KAIST). Prof. Ryu's research interests lie in predicting mechanical strength through theory and computer simulations of defect microstructures across multiple scales. In particular, his recent research subjects include (1) nanoscale fracture: strength of graphene, graphene composites, and metallic glasses (2) nanoscale plasticity: plastic deformation mechanisms of TiAl alloy and cementite-ferrite interfaces, (3) wetting theory: various wetting modes and wetting transition on rough surfaces, (4) mechanics of composites: homogenization theory for effective mechanical and thermal properties, and theoretical and computational study on bio-inspired composites. He has published around 45 papers on international journals, and serves as an associate editor of *Frontiers in Materials-Mechanics of Materials*, and a member of editorial board of *Scientific Reports*.

You are cordially invited to attend!

Special Guest Seminar