Finemechanics course

Fracture and Reliability Research Institute

Design and Evaluation of Function and Reliability of Materials

Suzuki (Ken) Laboratory

FRI Fracture and Reliability Research Institute Established in 1964

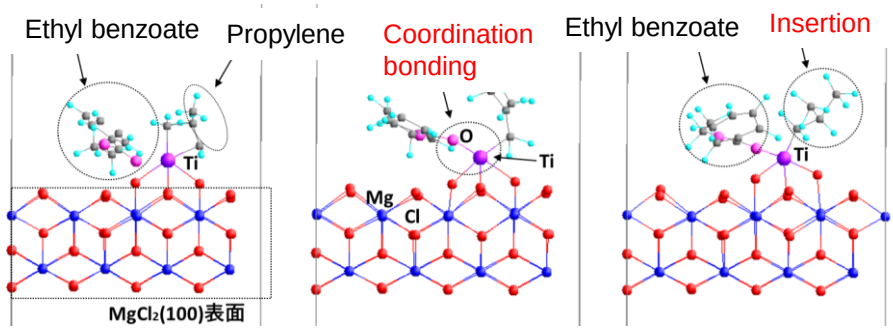
Achievement of a safe and secure society through the control of material functions and degradation

【Research Policy】 We will elucidate the mechanisms of function and performance of materials through atomic-level simulations and experiments, and develop molecular design, manufacturing, and evaluation techniques to prevent degradation and damage of materials used in harsh environments.

Research Topics

Functional Design of Materials by Atomic-Level Simulation

➢ Chemical Reaction Simulation of Resin Material Synthesis Process



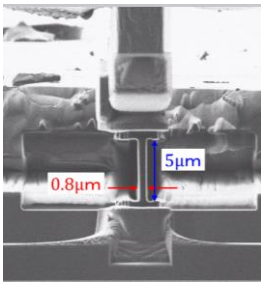
Propylene polymerization reaction dynamics with Ziegler-Natta catalyst

Prediction of resin amorphous structures and properties by polymerization reaction simulations

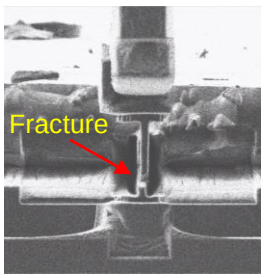
Development of high performance resin materials by synthesis process control

Elucidation of Degradation and Damage Mechanisms

➢ Evaluation of deformation characteristics of next-generation power device materials

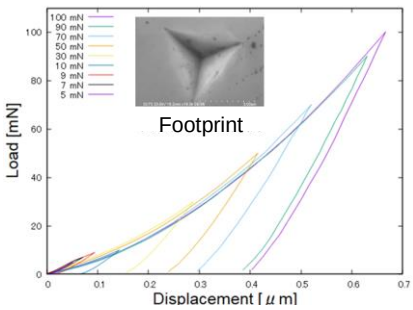


Before test

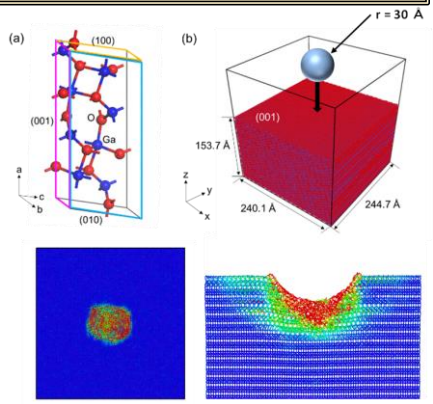


At fracture

Micro Tensile Testing of Ga_2O_3



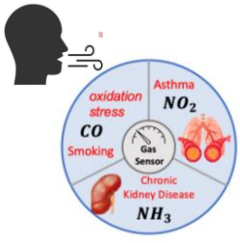
Indentation test of Ga_2O_3

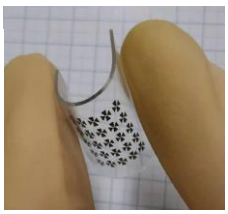


MD simulation of the indent formation process

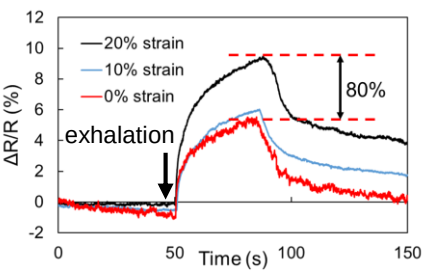
Development of Carbon Material Based Health Monitoring Devices

➢ Health monitoring devices applying strain-controlled two-dimensional materials

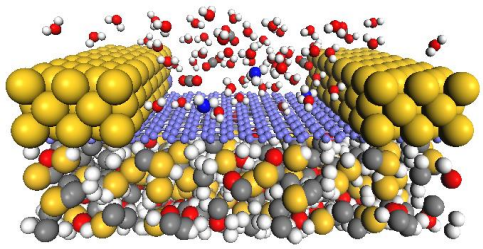




Flexible gas sensor



Graphene-base gas detection sensor for exhaled breath



Atomic-level simulation of graphene-base gas sensor structure