Interactive exhibit: Skin-age estimation

Yoshikawa Lab.

[New Frontiers of Solid Mechanics via **Simulation Integrated Material Testing**]

Center for Research on Innovative Simulation Software

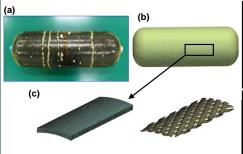
http://www.young.iis.u-tokyo.ac.jp

Multi-scale solid mechanics

Graduate school of engineering, Department of Mechanical Engineering

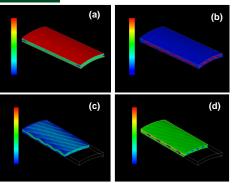
New Frontiers of Solid Mechanics via Simulation-**Integrated Material Testing**

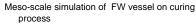
Carbon Fiber Reinforced Plastic (CFRP)



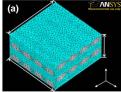
Meso-scale modeling of high pressure hydrogen tank for fuel-cell vehicle

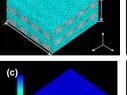
- (a) Type III FRP vessel (b) Volume model
- (c) FEM models for resin and fiber bundle

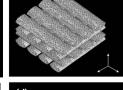


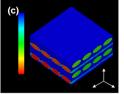


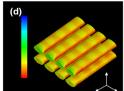
- (a) Temperature (b) Degree of cure
- (c) Residual strain (d) Residual stress











Meso-scale damage propagation analysis of laminate FEM models for (a) Resin, (b) fiber bundle. Estimated stiffness deterioration in (c) resin, (d) fiber bundle

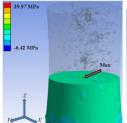
Aluminum die cast



Automobile parts by aluminum die casting



3D porosity distribution obtained by X-ray CT



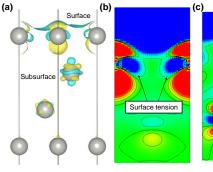
Fractographical proof

Prediction of fatigue crack initiation site by the maximum principal stress

Human-skin wrinkling Multi-laye structure of human skin Stage II Multi-layer models and buckling modes

Winkle size vs aging FEM-predicted variation of buckling mode with aging

Stress in atomistic scale



Electronic structure (ES) in Pd (111) surface by simulation Subsurface

(a) Difference of ES between surface and bulk (b) Charge relocation in surface bonds (c) Charge relocation in Subsurface bonds

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