

# **Hydrostatic force controls dislocation healing and recrystallization in 3<sup>rd</sup> generation advanced high strength steels**

Chan-Sheng Wu<sup>1</sup>, and Shi-Wei Chen<sup>1</sup>

<sup>1</sup>National Synchrotron Radiation Research Center, 101 Hsin-Ann Road, Hsinchu Science Park, Hsinchu, Taiwan

## **Abstract**

The structural evolution of advanced steel under hydrostatic deformation was explored precisely by synchrotron x-ray diffraction and line profile analysis. Phase transformation, texture variation, and the corresponding change in dislocation density were presented clearly. Results indicate stress partition in the hard plane, BCC (211), leads to austenitic reversion, a phase transformation from BCC to FCC. The abruptly decrease in the dislocation density reflects the process is ascribed to recrystallization because of dislocation healing under hydrostatic force. This study thus provides a new driving force, a hydrostatic deformation, to start recrystallization in steels. Meanwhile, the control of BCC to FCC phase transformation will enable us to design and improve the ductility of advanced steels furthermore.

***Keywords– hydrostatic deformation, line profile analysis, recrystallization, dislocation healing***