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Using X-ray nanoprobe to analyze structure stress of steel

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The X-ray nanoprobe (XNP) provides versatile X-ray-based inspection technologies, including diffraction, absorption spectroscopy, imageology and so on. Also it will improve the analysis scale of inhomogeneous materials, tiny and diluted samples to the nanoscale. Moreover, the high-transmitted XNP can be used to inspect the “Nano World” like atomic arrangements, chemical and electronic configurations, which are widely adopted in the physics, chemistry, materials science, semiconductor devices, nanotechnologies, energy and environmental science, and earth science. Beside to the opening to the researchers, it is also important to improve the inspection and research strength of the XNP in the nanomaterial’s field, in order to increase the academic influence of the XNP and the Taiwan Photon Source. The primary experimental technique of XNP includes X-ray fluorescence spectroscopy (for the analysis in the depth-of-field distribution of elements), extended X-ray absorption spectroscopy (for the analysis in the electronic configuration and the atomic or molecular bonding length), excitation X-ray fluorescence spectroscopy (for the analysis in the recombination and transport of carriers), in-phase scanning X-ray imageology (the Fourier phase transform calculation can improve the space resolution down to 3 nm to 5 nm and detect the stress distribution inside the nanostructures). The design XNP and the experimental applications will be reported.

Biography

Shao-Chin Tseng has pursued his PhD from Department of Materials Science and Engineering, National Taiwan University. He is the Assistant Scientist of National Synchrotron Radiation Research Center. He has studied on nanotechnology, X-ray nanoprobe, optoelectronic materials, semiconductor process and biomedical sensing. He has published more than 25 papers in reputed journals.

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