

## Further Investigations on Pseudo-Strain Induced in Neutron Strain Measurement

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In the strain measurement using neutron diffraction, pseudo-strains have been known to be generated due to the surface effect and the neutron attenuation effect, and its generation mechanism has been discussed extensively. In a previous study using the angular dispersive (AD) neutron diffraction technique, it has been suggested that the pseudo-strains due to the surface effect are caused by three influence factors, i.e., a wavelength effect, a peak clipping effect and a geometrical effect. Furthermore, the modeling of the pseudo-strains due to the surface-effect has been successfully achieved in the Time-Of-Flight (TOF) as well as AD neutron diffraction techniques. However, there are many cases which cannot be explained by the conventional theory. For discussing this reason, in this study, pseudo-strains due to the surface effect and the neutron attenuation effect were investigated further by going back to the principle of the issues on pseudo-strains. The pseudo-strains were discussed on the strain measurements in the annealed steel plate using the TOF and AD methods, and the effects of the optical systems, such as gauge volume size, monochromator curvature and neutron energy, on the pseudo-strains were investigated. It was clarified that the incident-beam characteristics, e.g., the incident neutron beam divergence and wavelength distributions near the edges of the gauge volume, were especially important factors for discussing the pseudo-strains due to the surface effect and the neutron attenuation effect in addition to the conventional principles suggested in the previous studies.

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