

A High-energy-resolution Monochromator for Krypton-83 Nuclear Resonant Scattering

J. Y. Zhao, T. S. Toellner, M. Y. Hu, W. Sturhahn, E. E. Alp
Advanced Photon Source, Argonne National Laboratory, Argonne, IL, U.S.A.

Methods and Materials

We have constructed a high-energy-resolution monochromator [1] for nuclear resonance scattering from the 9.4-keV nuclear transition in krypton-83. The monochromator consists of two highly asymmetric Si(733) crystal reflections in a dispersive (+, +) arrangement (Fig. 1). It produces an energy bandwidth of 2.3 meV (Fig. 2).

Results

This monochromator has been successfully used to perform nuclear forward scattering and inelastic nuclear resonant scattering from a solid krypton-83 sample that was sealed in a diamond anvil cell at 2.15 GPa and room temperature.

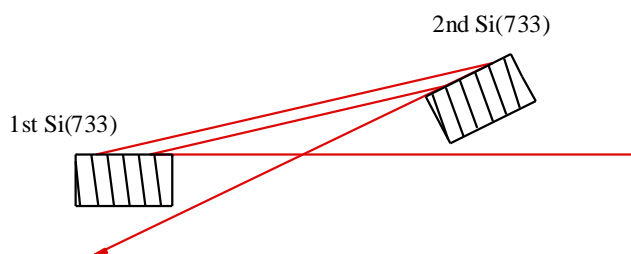


FIG. 1. Schematic of the high-energy-resolution monochromator for 9.4-keV x-rays.

Acknowledgments

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References

[1] J. Y. Zhao, T. S. Toellner, M. Y. Hu, W. Sturhahn, and E. E. Alp, Rev. Sci. Instrum. **73**, 1608 (2002).

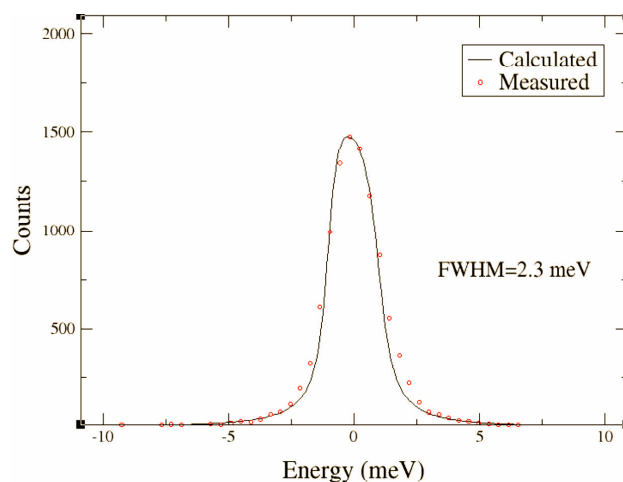


FIG. 2. Measured energy response function compared with a simulation. The full width at half maximum (FWHM) of the measured energy response function is about 2.3 meV.