

## XIV. X-RAY DIFFRACTION STUDIES\*

### Academic and Research Staff

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### Graduate Students

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## RESEARCH OBJECTIVES

The work of this group is centered on the development and application of x-ray diffraction methods for studying (a) imperfections in crystalline materials, and (b) the structure of amorphous materials.

The present studies of the structures of amorphous materials make use of two improvements over the older methods. By utilizing fluorescence excitation in the detector, it is possible to measure the intensity of the unmodified scattering with the Compton component removed. This makes it possible to obtain significant data out to  $\sin \theta/\lambda$  values which are twice the previous limit, and this results in radial distribution functions with twice the earlier resolution. By making the interpretation in terms of "pair functions," it is possible to have an exact and rigorous interpretation that is free from the earlier approximations such as considering the different scattering factors as proportional to one another. It is necessary to make corrections for multiple scattering, and a rigorous treatment of this problem has been completed.<sup>1</sup> The present work is concentrated on the structures of simple glasses, such as  $\text{SiO}_2$ ,  $\text{B}_2\text{O}_3$ ,  $\text{GeO}_2$ ,  $\text{Na}_2\text{O-B}_2\text{O}_3$ , and  $\text{Na}_2\text{O-SiO}_2$ .

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## References

1. B. E. Warren and R. L. Mozzi, *Acta Cryst.* 21, 459 (1966).

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