

Gjøannes Prize Lecture

GM02

A Convergence of Beauty and Utility

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The effective routine achievement of useful convergent beam electron diffraction (CBED) patterns was frustrated for many years until transmission electron microscopes (TEMs) were developed that overcame the practical difficulties. Because specimen thickness and orientation are two critical parameters in electron diffraction and are not under good control because of the difficulty of producing thin enough regions it was necessary to have TEMs capable of forming small focussed probes of less than 100nm diameter in local environments where the hydrocarbon level was sufficiently low to reduce carbon contamination to a reasonable level. Once these problems were overcome the importance of three-dimensional diffraction became apparent but to exploit this property it was necessary to develop TEMs with a large angular range in the diffraction plane. With appropriately designed instruments very beautiful CBED patterns could be obtained from crystalline samples and a variety of experimental techniques were exploited to extract meaningful information from them.

Keywords: Convergent beam electron diffraction