

Preface

Over the last two decades, scanning transmission electron microscopy (STEM) has become a very popular and widespread technique, with the number of publications and presentations making use of STEM techniques increasing by about an order of magnitude. Although the strengths of the technique for providing high-resolution structural and analytical information have been known and understood for much longer than that, the key to its more recent popularity has undoubtedly been the availability of STEM modes on instruments available from the major TEM manufacturers. Gone are the days when researchers wanting the unique capabilities of high-resolution STEM had to undertake the task of keeping a VG dedicated STEM instrument operating.

Given the current interest in the technique, we felt that the time was right to review the current state of knowledge about STEM and STEM-related techniques and their application to a range of materials problems. The purpose of this volume is both to educate those who wish to deepen their understanding of STEM and to inform those who are seeking a review of the latest applications and methods associated with STEM. We are delighted that so many of our colleagues accepted our invitation to contribute to this volume, and we are indebted to them for their efforts in creating such excellent contributions. The following chapters illustrate how close STEM has brought us to the ultimate materials characterisation challenge of analysing materials atom by atom.

We hope that the following chapters demonstrate the spectacular results that can be achieved when performing the relatively simple experiment of focusing a beam of electrons down to an atomic scale and measuring the scattering that results.

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