IMPROVEMENTS AND ACTUAL PROBLEMS IN DOMAIN IMAGING BY TYPE-I MAGNETIC CONTRAST IN SEM

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9.7 cm

Improvements in domain observation by the scanning electron microscope (SEM) type-I magnetic contrast have been achieved thanks to the use of digital image processing (DIP) system. They are illustrated by the examples of domain images at the (0001) surface of cobalt monocrystals. Domain images with considerably enhanced contrast and reduced noise can be obtained. By combining image alignment with image subtraction and summation techniques, it is possible at present to separate superimposed magnetic and non-magnetic features in the images taken with a single secondary electron detector. Other important advantages of using DIP system are also mentioned. As a consequence, detailed studies of domain structures in the cases of very weak type-I magnetic contrast and complex domain patterns, which were not possible before, can now be made. The actual problems related to the complicated mechanism of type-I magnetic contrast and its relatively low resolution are discussed. It is concluded that the crucial factor limiting the resolution is at present the signal-to-noise performance, and that the complex character of the interaction between secondary electrons and the stray field of the specimen can be a limit for high resolution of type-I magnetic contrast.

13.4 cm

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