

Detection of Disk-Like Particles in Electron Microscopy Images

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Abstract Quantitative and qualitative description of particles is one of the most important tasks in the Electron Microscopy (EM) analysis. In this paper, we present an algorithm for identifying ball-like nanostructures of gahnite in the Transmission Electron Microscopy (TEM) images. Our solution is based on the cross-entropy clustering which allows to count and measure disk-like objects which are not necessary disjoint or with not smooth borders.

1 Introduction

In the recent years, describing the structure of nanomaterials with measure from a few to several hundred nanometers become very important in particular in medicine and biology [3, 4, 9]. Ball-shaped nanoparticles of gahnite with a biologically active layer adsorbed to their surface have the potential to be used as a biological nanosensors [6, 13]. The geometry and the size of a gahnite nanoparticle is very important as it determines its ability to be injected into blood vessel as biological nanosensor. One of the most important and most reliable techniques for identifying the nature and form of nanomaterials is Transmission Electron Microscopy (TEM). In the case of gahnite nanoballs, the quality of nanomaterial produced depends on the number and size of ball-like nanoparticles.

In this paper we present a method for estimating the number and size of the gahnite nanoballs that are observed in TEM images. The nanomaterial an-

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