

## عنوان مقاله:

Analysis of Particle Size in Composite Materials Using Image Processing

## محل انتشار:

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## خلاصه مقاله:

Composite materials are the most important materials in materials science and engineering, which contain two or more materials. In materials engineering, the scanning electron microscopy (SEM) technique is an approach to measure the material's particle size. A new procedure was used instead of SEM is called Artificial Intelligence (AI). Artificial Intelligence (AI) is an interdisciplinary science and branch of computer science that involves solving problems that require human intelligence and capabilities. The computer vision is a subfield of AI, which uses some algorithms to detect the details of images by using computer called image processing. Detecting the particles and measuring the size of materials scanned by SEM is an essential task that helps to describe their feature, traditionally, the size is calculated manually by adding mesh to an SEM image or by drawing a diagonal line in an arbitrary particle. In this paper, a new model based on Artificial Intelligence (AI) is proposed using computer vision to analyze the size of all particles. This model is used to detect the particle size of additives in composite materials like graphene flakes and measure the size of them depending on the reference size fixed on the scanning electron microscope (SEM). The model was used based on the Open-source Computer Vision (OpenCV) library, utilizing multi-layers of canny edge detection, Sobel filter, Brightness and contrast algorithms, using Python ۳. The results have achieved very satisfied indication with a very low process time = ۰.۲ mili-seconds

## کلمات کلیدی:

Composite, Materials, computer vision, image processing

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