Analysis of optical light microscopy and effect in the speed and resolution.

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Abstract

Optical microscopy is a well-established method for characterization, but it has undergone various changes in recent years. These may include higher resolution, faster data collection, more quantitative results, or more sensitive detection. Most of these advances have been driven by biological applications but are related to polymer microscopy. Optical microscopy and confocal optical microscopy were the first magnification techniques to observe morphology, typically used for biological samples, but also to access gel morphology. I can do it. Optical microscopy analysis can fairly quickly determine whether the cut surface has been correctly reached and whether the surface quality is correct. An LED mounted on a metal base.

Keywords: Microscopy, Phase contrast, Photomicrography, Fluorescence microscopy.

Introduction

Optical Microscopy (OM) was performed on a Leica DM IRM. Scanning Electron Microscopy (SEM) was performed on samples were cut perpendicular to the process direction and embedded in cold-curing resin. The SEM sample was mounted on a conductive holder. All samples were sanded and polished using grit SiC paper on an automated grinder equipped with individual sample holders. A final polish was done using Struers Oxid polishing fluid. Ethanol was used in all steps to avoid premature oxidation. The microstructure was revealed by soaking the samples for 30 seconds [1].

The demand for advanced imaging of nanometre-scale objects with spatial resolution below the diffraction limit has led to the emergence of various super-resolution techniques. Many of them, such as stimulated emission depletion microscopy, spontaneous emission and photo activation localization microscopy PALM, and stochastic optical reconstruction microscopy characterize the optical properties of fluorescent emitters. to selectively image the turn-on of nearby molecules. or off or nanoparticles NP. Then it becomes possible to use the centroid of the separated image, which improves the resolution. Both recently reported Orientation-Dependent Localization Microscopy ODLM and Super-Resolution Plasmonic Imaging Microscopy SRPIM use the phenomenon of Localized Surface Plasmon Resonance LSPR to detect imaging non-fluorescent metallic NPs in medium [2].

Plasmon resonance is the collective oscillation of free electrons induced by an external electric field. Free electrons in metallic NPs have natural frequencies due to binding forces that respond to displacements generated by the electrostatic attraction of an external electric field. Silver NPs with dimensions of tens to hundreds of nanometers are subjected to resonance conditions at visible wavelengths. A new type of fine grain emulsion, called Nano-Imaging Tracker NIT, was specifically designed for use as a detector in the Nuclear Emulsion WIMP Retrieval by Orientation Measurement experiment. In this experiment, we develop a next-generation strategy for directional detection of so-called weakly interacting mass particles WIMPs, a complementary approach that provides a clear signature of the galactic origin of dark matter is employed [3].

Analysis method:

As previously mentioned, the silver grains in NIT emulsions are non-spherical and in the form of randomly oriented filaments. Since the illumination system uses monochromatic light, particles become discernible when their reflectance is enhanced by the His LSPR phenomenon. H. When the wavelength of the Plasmon resonance peak matches the wavelength of the illumination light, which occurs only at certain polarization angles. When multiple particles are closer than optical resolution due to their filament-like shape and random orientation. The contribution of each particle to the detected unresolved image brightness depends on the polarization angle. This effect causes detectable changes in the shape and position of observed images of unresolved dense particles, allowing their separation and measurement [4,5].

Conclusion

This based on examining the intensity of various polarization components of light scattered by silver particles. Due to the polarization anisotropy of the LSPR phenomenon, the intensity distribution of the scattered light changes as the polarization angle changes, providing access to hidden nanoscale details beyond the diffraction limit.To test the performance of the

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designed microscope and analytical method, we used samples horizontally exposed to carbon ions at an energy of 60 keV. Carbon ions are implanted into the emulsion film under vacuum.

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