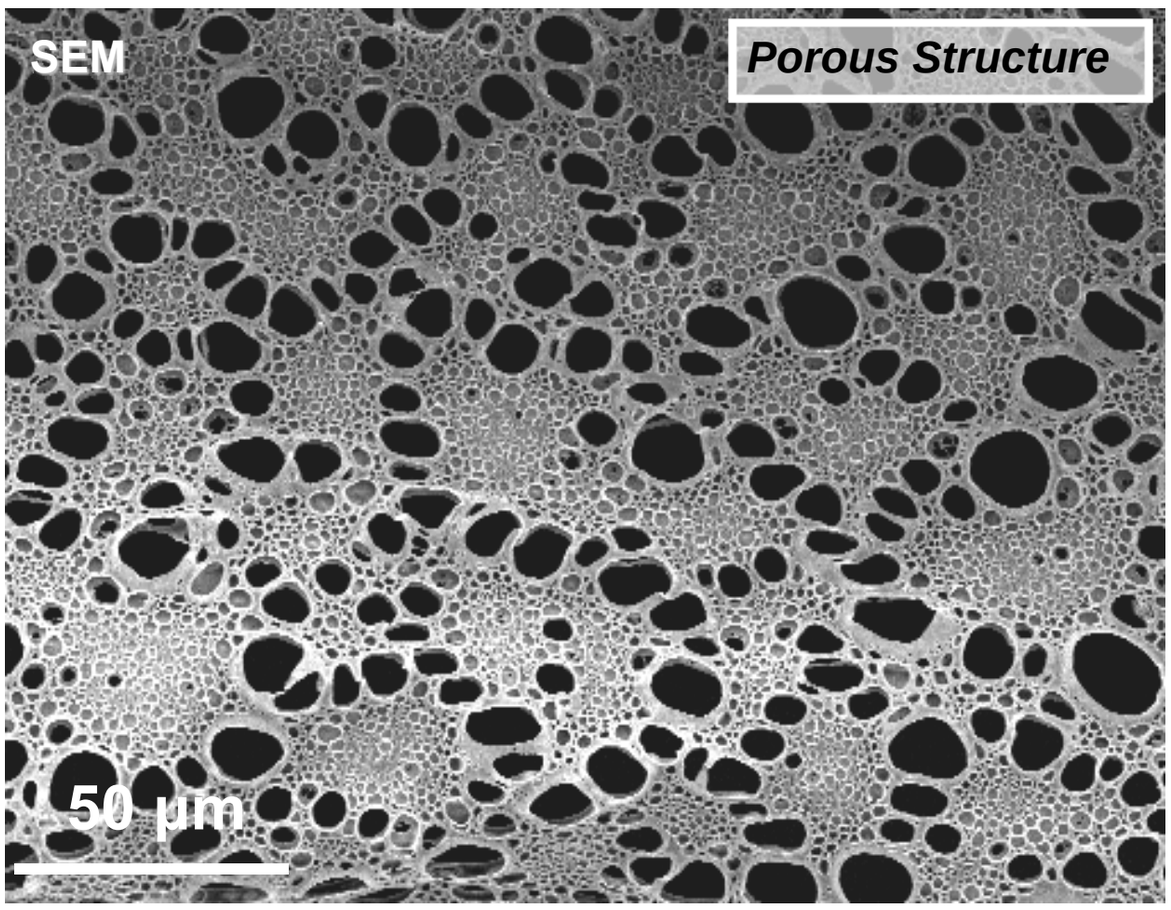
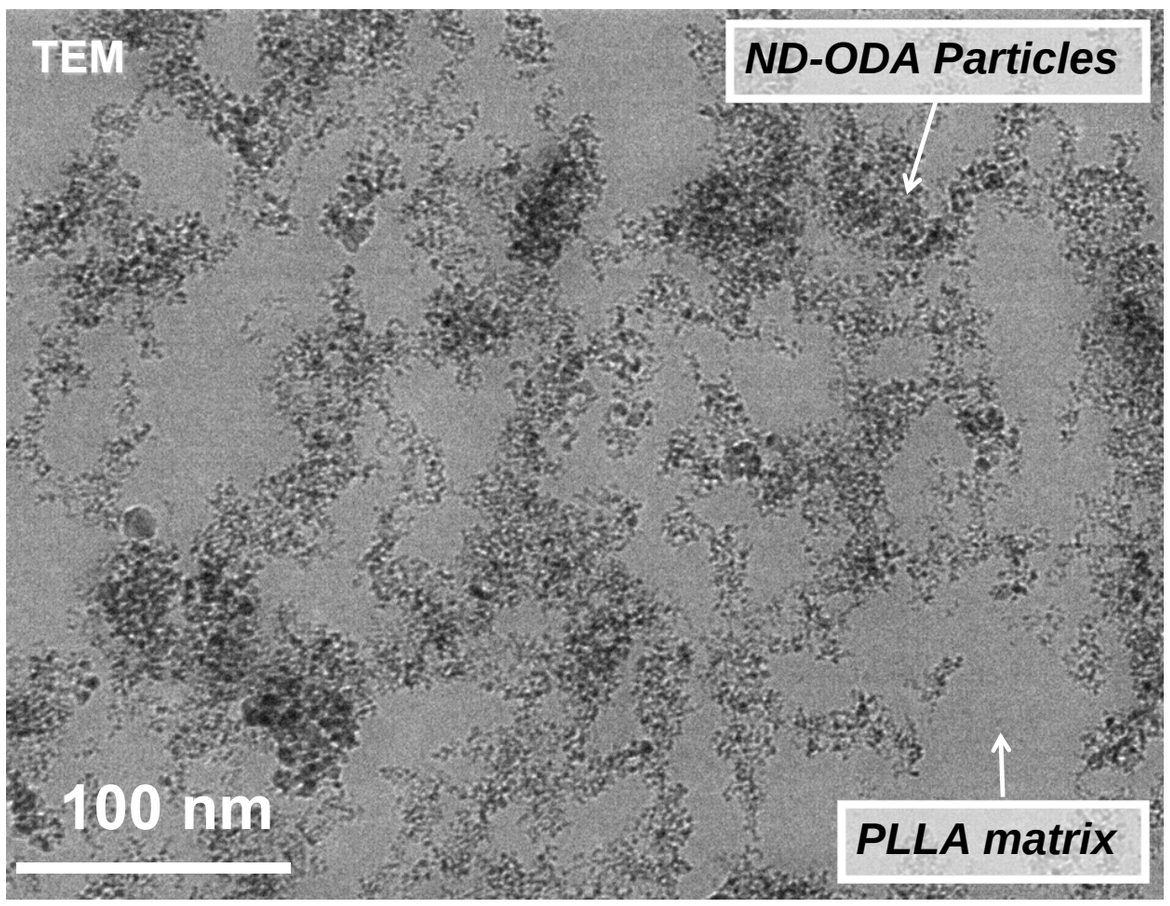
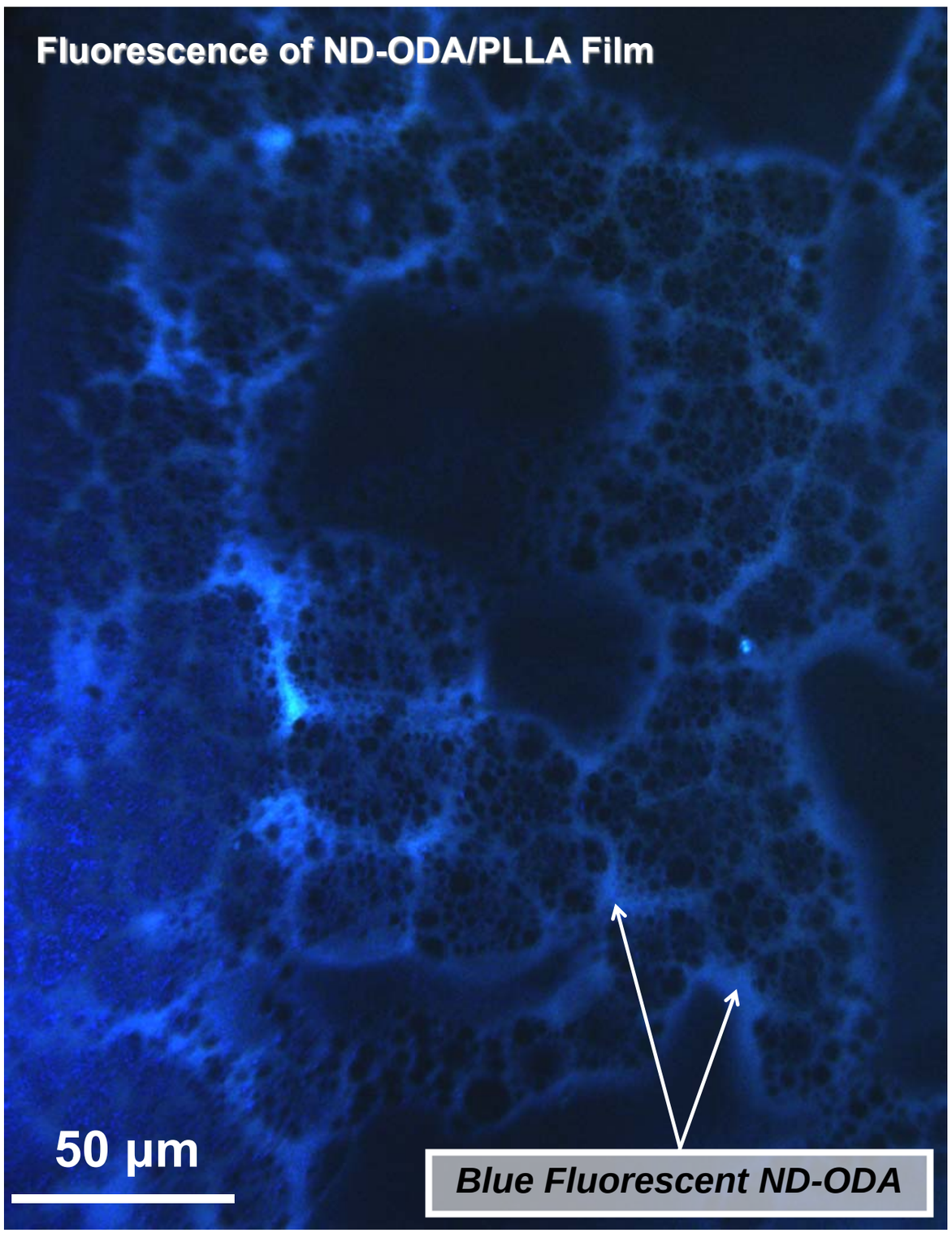
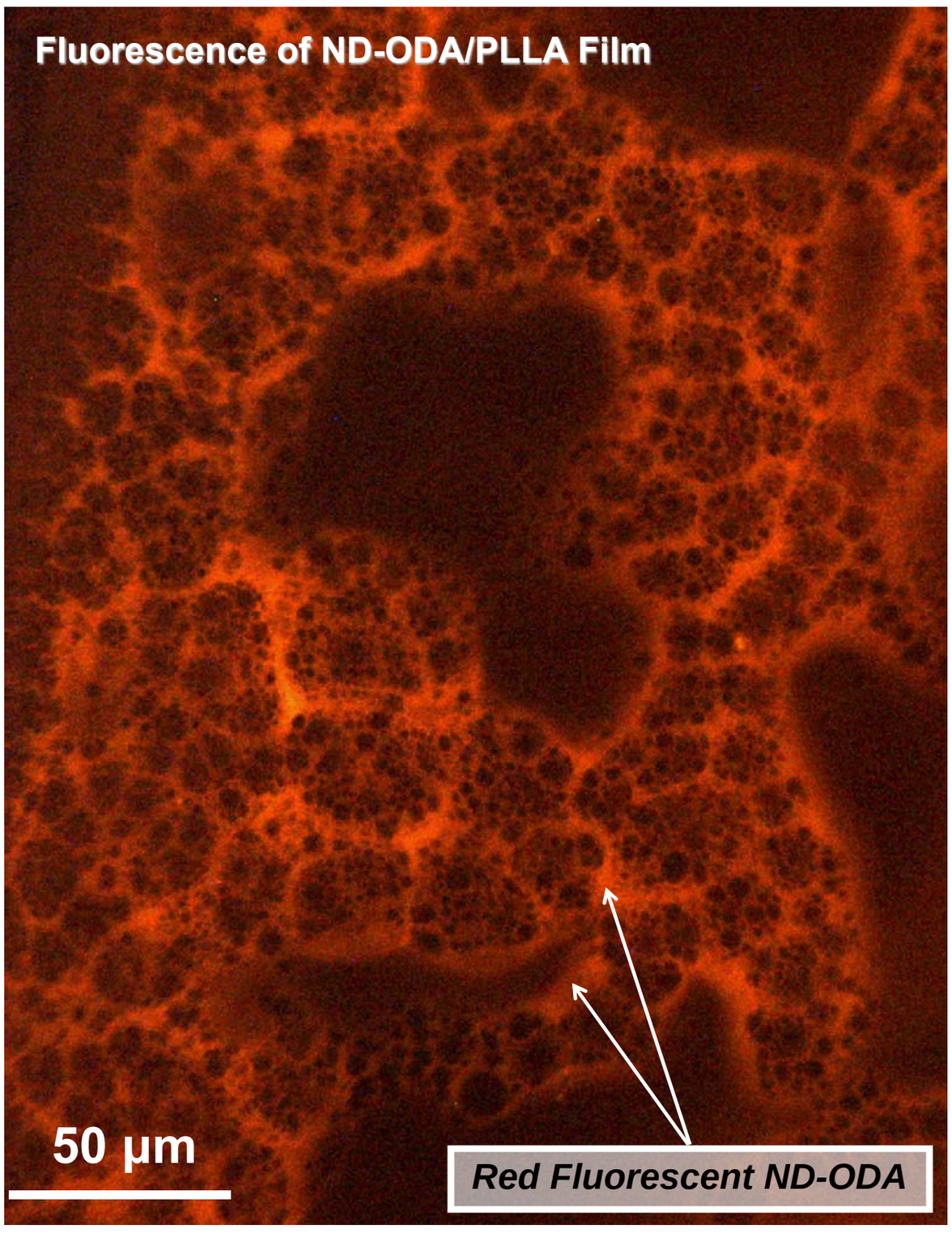
Fluorescent Nanodiamond Reinforced PLLA Scaffolds For Tissue Engineering and Bone Repair





Biodegradable mechanically reinforced scaffolds for bone repair made of PLLA with hydrophobic fluorescent nanodiamond (ND-ODA) were produced by solution casting onto a glass slide using chloroform as a solvent. The Scanning Electron Microscopy (SEM) image shows the porous structure of the 10%wt ND-ODA/PLLA thin film, which facilitates cell growth. Transmission Electron Microscopy (TEM) reveals a uniform dispersion of ND-ODA particles forming an interconnected network in the PLLA matrix. Due to the presence of ND-ODA in the polymer around pores, the film shows blue and red fluorescence under UV excitation. The fluorescence patterns coincide with the porous structure seen in SEM.





Q. Zhang,[1] V. Mochalin,[2] Y. Gogotsi,[2] P. Lelkes,[3] J. Zhou[4]

[1]College of Medicine, Surgical Engineering Enterprise (SEE), [2]Department of Materials Science & Engineering, [3]School of Biomedical Engineering, and [4]Department of Mechanical Engineering & Mechanics, Drexel University, Philadelphia, PA 19104

Combined Techniques