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Near Infrared Optical Properties of Whole Human Blood and Blood Containing Nanoparticulates LAWRENCE C. MIMUN, BRIAN YUST, KELLY L. NASH, DHIRAJ K. SARDAR, University of Texas at San Antonio — Whole human blood is optically characterized in the near infrared (NIR) with and without the addition of nanocrystals. The optical properties were obtained using the double-integrating sphere technique at the Nd excitation wavelength of 808 nm. Y_2O_3 and Nd^{3+}:Y_2O_3 nanoparticles were added in predetermined amounts to water, blood plasma, and whole blood samples, from which a computational analysis was conducted using the Kubelka-Munk calculational method, the Inverse Adding Doubling Method, and the Magic Light Monte Carlo Method to characterized the optical properties such as the absorption (μ_a) and scattering coefficients (μ_s) and the scattering anisotropy (g). Through comparison with control samples, the optical properties of each component (blood, plasma, and nanoparticles) can be determined individually, thus illuminating any changes due to the biological environment. The emission from the Nd^{3+}:Y_2O_3 particles through the blood is also detected thus exhibiting their usefulness as real world biological markers.

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