

Investigation Of Binding Between Hemoglobin And Non-Functionalized Carbon Nanotube

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Abstract

Carbon nanotube (CNT) has high potential to be used as a biosensor or drug carrier. In order to achieve such applications, it is important to understand the binding between CNT and proteins. A common paradigm for the protein and CNT binding seems to be such that CNT needs to be functionalized first. Thus an experiment study on the binding between hemoglobin and non-functionalized CNTs has been conducted. The result shows that hemoglobin can bind with non-functionalized carbon nanotube, and this binding can be identified by frequency change with Raman spectrum. However, this binding does not change Raman luminescence under the 514 nm excitation wavelengths. The immediate application of this finding is to use non-functionalized carbon nanotube as a biosensor to measure H₂S in blood in which hemoglobin takes 45% of the total blood volume. Other potential uses of non-functionalized carbon nanotube to bind selective groups of proteins are hinted.