Lithium phthalocyanine - radical-based molecular oxygen sensor

Krzysztof Tadyszak[1,2] and Miroslav Vetrik[1]

[1] *Institute of Macromolecular Chemistry, Czech Academy of Sciences, Prague, Czech Republic*

[2] *Institute of Molecular Physics, Polish Academy of Sciences, Poznan, Poland*

Lithium phthalocyanine nanocrystals are radical-based dissolved oxygen sensors (oxygen partial pressure sensor- pO_2). The main field of their applications is the measurement of dissolved oxygen in tissues, tumors, 3D cell cultures (e.g. spheroids), or cells in biological *in-vivo* and *in-vitro* studies. Sensors are biocompatible, stable in biological conditions - unsolvable in water, which makes them an ideal system for long-period oxygen level monitoring. Molecular oxygen sensors of dissolved oxygen (pO_2) are extremely important for biological and medical *in-vivo* studies in various tissues (e.g. tumors in a mouse model). Changed oxygen levels can be a marker of general inflammatory processes, miss-build of blood vessels, poor diffusion geometry, and severe structural abnormalities in tissues (e.g. tumors). Above that medical treatment can be dependent on pO_2 levels e.g. radiological anticancer therapy. For intracellular processes, oxygen is also important inside living cells in gaining energy by the formation of adenosine triphosphate (ATP) in the mitochondria. The principle of work is based on the detection of magnetic field fluctuations caused by tumbling O_2 molecules around the spin probe. Such fluctuations cause EPR line broadening which can be calibrated and quantified for EPR *in-vivo* oximetry/mapping purposes.

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