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85793 Tris(4,7-diphenyl-1,10-phenanthroline)-ruthenium hexafluorophosphate $Ru(dpp)_3(PF_6)_2$

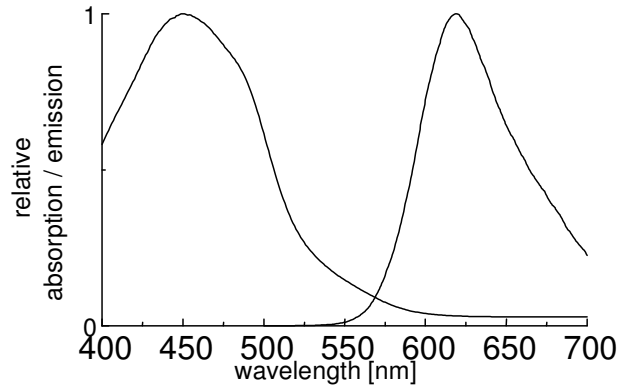
Application

Superior lipid soluble luminescent oxygen probe (see below).

Product Description

Net formula	$C_{72}H_{48}F_{12}N_6P_2Ru$
MW	1388.19
Appearance	orange solid
Solubility	soluble in ethanol, methanol, chloroform, toluene (moderately)
Quantity	1 mg, 5 mg

Absorption and fluorescence emission of $Ru(dpp)_3(PF_6)_2$ in a polystyrene film



abs. λ_{max} 455 nm, luminescence λ_{max} 613 nm

Quenchability by Oxygen:

The fluorescence of $Ru(dpp)_3(PF_6)_2$ is strongly reduced by molecular oxygen due to dynamic quenching. Therefore, it is a viable oxygen probe based on either measurement of intensity or decay time. Quenching usually is expressed as the ratio of the decay times in the absence (τ_0) and presence (τ), respectively, of a quencher and can be presented as a Stern-Volmer plot as shown below. The graph says that, e.g., at a partial pressure of 200 hPa the decay time (and intensity) of $Ru(dpp)_3(PF_6)_2$ have dropped by a factor of 2 due to dynamic quenching.

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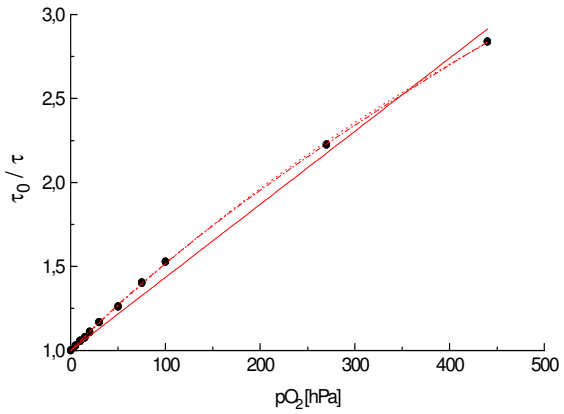
The linear graph gives the ideal situation. In practice (for example if the probe is dissolved in a polymer), deviations from linearity are observed as shown in the graph.



Protocol for labelling polystyrene beads with $Ru(dpp)_3(PF_6)_2$:

Polystyrene beads (5 mg) are suspended in 20 mL of an methanol/water mixture (1/1, v/v). Then, a solution of 1 mg of the Ru complex in 0.5 mL of toluene is added and the mixture sonicated for 5 min. The suspension is stirred over night and filtered (to remove sticky beads). After addition of 20 mL of water, the solvent is reduced to 2 mL using a rotary evaporator under reduced pressure. The suspension is then placed in a 2 mL Eppendorf cup, centrifuged three times (washing with water) and finally suspended in distilled water.