Developing an Oxygen Detection Device for a Microfluidic Hypoxia Chamber
Cost Analysis of Thin-film Sensor
November 16th, 2012

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Materials:

Material: Pt(II) Octaethylporphine Ketone
Company: Frontier Scientific, Inc.
Catalog No.: 040969
Formula: $C_{36}H_{44}N_4OPt$
Mass: 743.85 g/mol
Options/Sizes: 10 mg
Pricing: $235.00

Material: Polystyrene
Company: Sigma Aldrich
Catalog No.: 182427
Formula: $[CH_2CH(C_6H_5)]_n$
Molecular Weight: ~280,000
Density: 1.047 g/mL
Options/Sizes: 25 G
Pricing: $34.10

Material: Toluene (anhydrous, 99.8%)
Company: Sigma Aldrich
Catalog No.: 244511
Formula: $C_6H_5CH_3$
Molecular Weight: 92.14
Density: 0.865 g/mL
Options/Sizes: 100 mL
Pricing: $28.80

Fabrication of Thin-Film Sensor

- PS pellets dissolved in toluene to yield a 7% w/w solution
    - 7 g Polystyrene in 93 g toluene = 7% w/w solution
- PtOEPK dye added at 1 mg per 1 mL of PS solution

- Films prepared by pipetting 200 μL of solution onto 50 mm X 75 mm glass microscope slides
- Spin state to ensure flat, even surface

Materials Needed for Single Thin-Film Sensor

0.200 mg PtOEPK = $4.70
200 μL 7% w/w polystyrene solution
    12.26 mg Polystyrene = $0.0167
    188.29 μL Toluene = $ 0.054

TOTAL PRICE: $4.77 per thin-film sensor (NOTE: glass slides not included)