



CALIFORNIA STATE SCIENCE FAIR
2003 PROJECT SUMMARY

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Project Title Quantum Yield Studies of Singlet Oxygen Production by Bis-cyclometalated Ir(III) Complexes	
<p style="text-align: center;">Abstract</p> <p>Objectives/Goals To measure the quantum yields of singlet oxygen production of five bis-cyclometalated Ir(III) complexes.</p> <p>Methods/Materials Five Iridium(III) complexes (BSNIr*, BSNIrG, BTIrPy, BTIrG, and FIrPic) were investigated for their quantum yields of singlet oxygen production through time-resolved infrared luminescence spectroscopy. Quantum yields were obtained in various solvents. Quenching rates were also measured by similar principles.</p> <p>Results At 532 nm in benzene, the quantum yield of singlet oxygen production of BSNIrG (Quantum yield = 0.81), BTIrPy (Quantum yield = 0.95), and BSNIr* (Quantum yield = 0.77) are all above those of our standard, TPP (Quantum yield = 0.62), whereas BTIrG (Quantum yield = 0.43) are below our standard. At 355 nm in benzene, the quantum yield of FIrPic (Quantum yield = 1.0) and BTIrPy (Quantum yield = 0.96) are above those of our standard, TPP (Quantum yield = 0.62), whereas BSNIr* (Quantum yield = 0.60), BSNIrG (Quantum yield = 0.54), and BTIrG (Quantum yield = 0.50) are below our standard.</p> <p>Conclusions/Discussion Comparison of quantum yields in benzene shows that FIrPic has the greatest quantum yield. The decrease of FIrPic's quantum yield in methanol (Quantum yield = 0.46) indicates that H-bonding stabilizes its first excited state. There seems to be some correlation between a red shifted sensitizer, which has a high quantum yield, and a more blue shifted sensitizer, which has a considerably lower quantum yield.</p>	
Summary Statement This project measured the quantum yields on Iridium(III) complexes for its potential application in photodynamic therapy.	
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