



**CALIFORNIA STATE SCIENCE FAIR  
2004 PROJECT SUMMARY**

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| <b>Name(s)</b><br>Henry Fong; Johanna Tang; Allen Tran   | <b>Project Number</b><br><b>S0507</b> |
| <b>Project Title</b><br><b>Quantum Yield Studies of Singlet Oxygen Production by Square Planar Platinum(II) Complexes</b>  |                                       |
| <b>Abstract</b><br><b>Objectives/Goals</b><br>To determine the singlet oxygen quantum yields and quenching rates of several square planar Platinum(II) complexes and their trigonal-bipyrimidial Iridium(III) analogues.<br><b>Methods/Materials</b><br>Time-resolved laser spectroscopy was used to measure the singlet oxygen quantum yields. The procedure involves the preparation of a sensitizer solution in benzene. The solution is optically excited, and the singlet oxygen decay is detected with a Germanium photodiode detector. Data was processed with Excel and Origin.<br><b>Results</b><br>The singlet oxygen quantum yields were high. The five Platinum(II) compounds tested ranged from 0.97 to unity. The two Iridium(III) analogues of the Platinum(II) complexes exhibited lower quantum yields, 0.88 and 0.90. The complexes exhibited low quenching rates.<br><b>Conclusions/Discussion</b><br>Singlet oxygen quantum yields are affected by several processes, including spin orbit coupling and quenching rates. The higher quantum yields of the Platinum(II) complexes compared to their Iridium(III) analogues also shows that the active site of energy transfer involves the metal center and can, therefore, be affected by sterics. |                                       |
| <b>Summary Statement</b><br>The efficiency of singlet oxygen production by several Platinum compounds was determined   |                                       |
| <b>Help Received</b><br>Used lab equipment at CSULA under the supervision of Dr. Matthias Selke and Billy Hernandez.   |                                       |