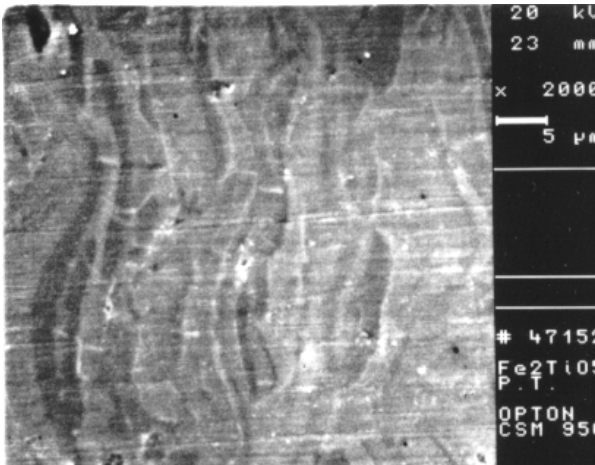


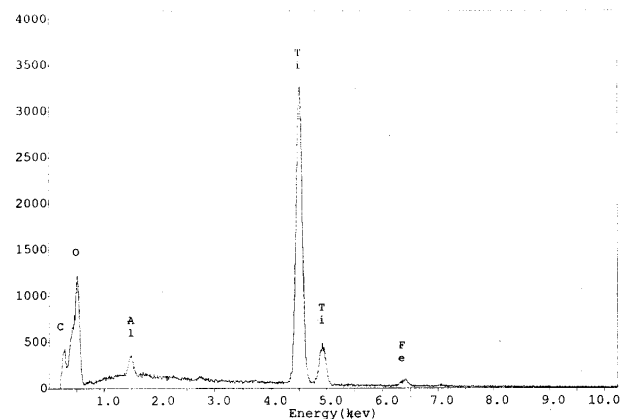
Recent work in the field of high temperature friction and wear has led to the development of iron oxide Titanium Dioxide based high temperature wear coatings. Tribology is the study of friction and wear of materials in the presence of lubrication. **Adiabatics** has combined the technologies of plasma sprayed coatings with thermal chemical bonding technology to generate a new hybrid coating which provides excellent low sliding friction coefficient with over 2.5 times the life of existing chrome oxide wear coatings.

**Chemical Composition:** Iron Oxide (Fe<sub>2</sub>O<sub>3</sub>), Titanium Dioxide (TiO<sub>2</sub>), Chrome Oxide, and Phosphate Glass Phase.



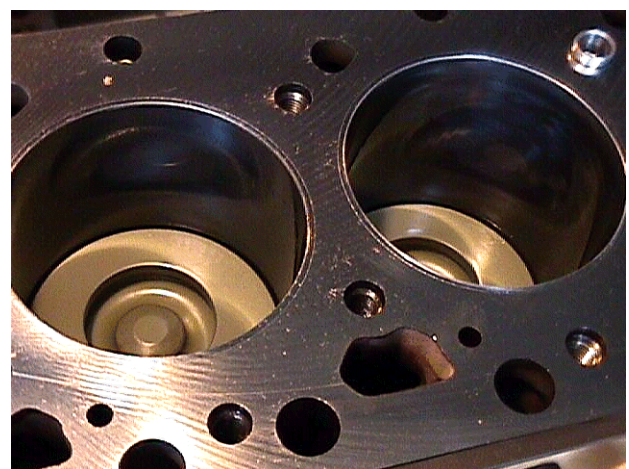
Cross Section of Iron Oxide Titanium Wear Coating Showing Infiltration of Iron Oxide Base Matrix with Cr<sub>2</sub>O<sub>3</sub> and Phosphate Glass Binder Phases.

ENERGY DISPERSIVE SPECTROMETRY (EDS)



EDS Print Out Shows Presence of Chemical Thermal Binder Phase in Iron Oxide Matrix.

**Iron Oxide Titanium Coated Cylinder Liners**



Coating Provides Over 2.5 Times Improved Wear Rate Over Previous Cr<sub>2</sub>O<sub>3</sub> Coating.

**Iron Oxide/Titanium Physical Properties**

<b>Composition</b>	(30% Fe <sub>2</sub> O <sub>3</sub> , 68% TiO <sub>2</sub> , 2% Impurities)
<b>Bond Strength</b>	> 6,000 psi (by ASTM epoxy pull test method)
<b>Microhardness</b>	800 Vickers DPH 100 gm load
<b>Open Porosity</b>	Less than 5%
<b>Density</b>	3.808 gm/cm <sup>3</sup> @ Room Temp.
<b>Maximum Use Temperature</b>	1,000°C
<b>Maximum Thickness</b>	≤ 2 mm
<b>Dry Friction Coefficient</b>	< 0.18 at 540°C versus Metco 505 Moly Spray
<b>Specific Heat</b>	@ Room Temp. 0.727 (W-s/gm-°K)
<b>Thermal Conductivity</b>	0.027 (W-cm <sup>-1</sup> °K <sup>-1</sup> ) @ Room Temp. 0.020 (W-cm <sup>-1</sup> °K <sup>-1</sup> ) @ 535°C

For additional information, call **Adiabatics, Inc.** at:  
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