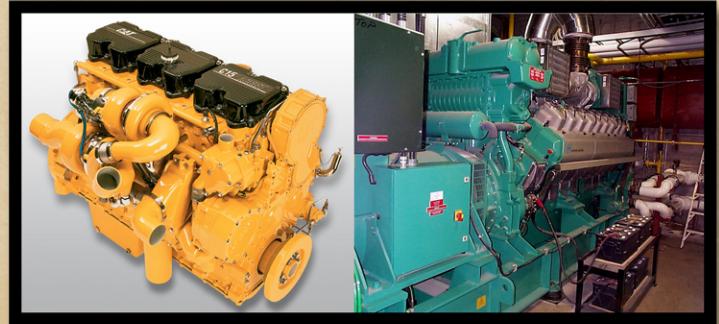


# Improved ARES Ignition Systems

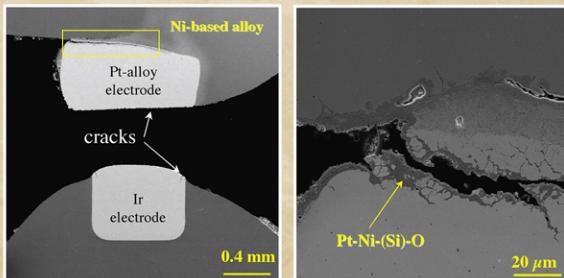
ORNL and Champion (Federal Mogul) are collaborating to manufacture and test prototype spark plugs that incorporate developmental alloys with improved corrosion resistance and enhanced plug lifetimes.



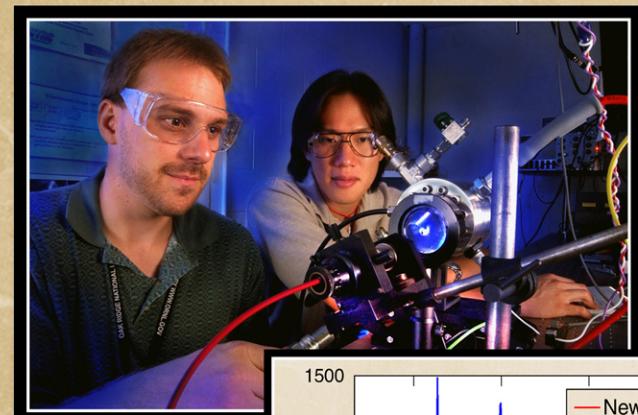
Ignition systems have been identified as a key technology to achieve cost, performance, and emission goals for reciprocating engines. Current spark plug lifetimes last 1000 – 4000 hours. Lifetimes of 8000 hours are desired.

The following tasks are the focus of this joint effort:

- Characterize the optical spectra of spark plug arcs to evaluate ignitability and erosion
- Measure erosion as a function of engine-tested time
- Develop an understanding of failure mechanisms
- Develop advanced alloys to improve corrosion resistance and extend lifetimes



Crack generation and growth through an oxide reaction zone were observed at Pt-alloy tip insert and Ni-based electrode interface. This phenomenon would significantly degrade the ignitability and performance of spark plugs and is likely a key life-limiting step.



Emission spectra indicate the presence of Ca in used plugs and absence in new plugs.

