The atomic absorption spectrometer was developed in the 1950s by Sir Alan Walsh from the CSIRO Division of Chemical Physics. This elemental analysis technique revolutionized chemical analysis techniques, especially in the 1960s. Despite the widespread acceptance of AA as an analytical technique, the fundamental limitations — including relatively slow multi-element determinations, high ppb detection limits, safety concerns and the requirement for attended operation — remain even after more than 60 years. While many laboratories have progressed to fast multi-element analysis techniques that offer faster and true trace level detection limits, including ICP-OES and ICP-MS, the AA technique has continued to be the workhorse technique in many laboratories for major, minor and some trace level analyses.

This poster describes an innovative new plasma source for elemental analysis that addresses the limitations of the AA technique. This technique produces linear dynamic range, detection limits and analysis speed superior to conventional flame AAS. Based on an atomic emission technique, this elemental analysis technique produces simpler spectra than ICP-OES and greater sensitivity than flame AAS. In addition, it eliminates the need to buy hollow cathode lamps. This innovative elemental analysis technique also eliminates the need for argon or indeed, any bottled gas. It operates from a compressed air supply, producing a significant reduction in operating costs and reduced infrastructure costs.

Common Challenges Facing Laboratories Doing Elemental Analysis Today
- Increased need for multi-element determination over a wide dynamic range
- Desire to reduce the overall cost of analysis due to rising costs (instrument supplies and consumables; power; labor, etc)
- Difficulty in sourcing some gases – especially in remote areas and emerging geographies
- Availability of suitably trained personnel to develop methods, perform sample measurement and interpret results
- Some laboratories are under pressure to improve safety by removing flammable gases

Agilent 4100 Microwave Plasma-Atomic Emission Spectrometer (MP-AES)
New technique for elemental determination using atomic emission
- Microwave excited plasma source
- Nitrogen based plasma - runs on air (using a N2 generator)

Microwave Excited Plasma
- Nitrogen can be supplied via bottled gas, dewar or nitrogen generator
- Magnetic excitation gives a toroidal plasma and an effective central zone for sample injection

The microwave magnetically excited nitrogen plasma
- Provides a robust, high temperature source in conventional torches (approx. 5000 K)
- Provides a cooler central channel suitable for sample atomization
- Creates high intensity atomization emission lines

For MP-AES application data, please attend these posters – ThP03, ThP04, ThP55, ThP36, ThP47 and FP30. Additional information can be found at www.agilent.com.