



TRACE AND ULTRA-TRACE ANALYSIS OF METALS USING ATOMIC ABSORPTION SPECTROMETRY

PROF. J R MUDAKAVI

Department of Chemical engineering
IISc Bangalore

PRE-REQUISITES : 10+2 +3 years of BE/BSC Basic knowledge of differential calculus and integration

INTENDED AUDIENCE : Chemists and Chemical Engineers, Environmental Engineers, Environmental Scientists, Civil Engineers, Pollution Control Administrators.

COURSE OUTLINE :

Introduction to pollution control monitoring, Introduction to Atomic Absorption Spectroscopy, Theoretical Principles of Atomic Absorption and emission phenomenon, Instrumentation, Optical benchmarking, flame and flame emission, absorption and flameless ETAAS, hydride generation, Cold vapor mercury analysis, Practice of Spectrophotometry, Applications of Absorption Spectrometry to pollution monitoring, Ambient Air Monitoring, Industrial Effluents and Metal Ions, Continuous Monitoring and Bio Chemical Analysis. This course is useful for the determination of metals as ions in μg , ng , pg levels in aqueous and nonaqueous solutions. It has applicability to air pollution, water and solid waste matrices. A emphasis is laid on fundamentals of atomic structure, spectroscopy, instrumentation, method development and industrial applications. The course will be useful for chemists, chemical engineers, metallurgists, biotechnologists and NGOs.

ABOUT INSTRUCTOR :

Prof. J R Mudakavi is a former faculty of Chemical engineering Dept, Indian Institute of Science, Bangalore. He has taught "Modern Instrumental Methods of analysis and Pollution Control" for 36 years. He is an authority on analytical instrumentation. He is the author of 2 books on Air Pollution and Hazardous Waste management. He has published more than 100 papers in National and International Journals, conferences, Symposia etc. He is a member of several expert committees such as CSIR DST MOEF KSPCB etc. He has offered two courses on instrumentation in NPTEL. He is a popular, Science writer and lecturer and environmentalist.

COURSE PLAN :

Week 1: Introduction to pollution control monitoring and Introduction to atomic structure

Week 2: Interaction of electromagnetic radiation with fundamental particles

Week 3: Instrumentation, for flame, flameless and graphite furnace AAS

Week 4: Mechanism of Atomization

Week 5: Design of atomizers, flame, graphite, hydride generation and Instrumentation of AAS & AES – electronics and optics

Week 6: Techniques of flame AAS, Interferences in flame and non flame AAS

Week 7: Interferences in Hydride generation AAS and cold vapor mercury, Applications of AAS to individual elements.

Week 8: Applications of AAS to individual elements continued, pollution monitoring and environmental sampling and conclusion.