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Analytical Chemistry II – Quiz (1st April, 2025)

1) Provide classification of interferences in atomic absorption spectroscopy.

- Spectral interferences
 - Two overlapping lines (rare)
 - Combustion products that absorb or scatter light
 - An interfering species present in the sample
- Chemical interferences
 - Formation of compounds of low volatility
 - Dissociation equilibria
 - Ionization equilibria

2) Describe operation of inductively coupled plasma source used in atomic emission spectroscopy. Draw a scheme of such a source.

Plasma is an electrically conducting gaseous mixture containing cations and electrons.

Plasmas achieve high temperatures (even 10,000 K).

The inductively coupled plasma (ICP) torch consists of concentric quartz tubes.

Argon is supplied at 5-20 L min⁻¹.

Induction coil is powered by radio-frequency (RF) generator (0.5-2 kW, MHz range).

Ions and electrons interact in the fluctuating magnetic field.

Heat is produced due to the movements of ions and electrons induced by the magnetic field.

Tangential flow of argon cools the quartz elements and focuses plasma radially.

