ADVANCED ANALYSIS METHODS

Dr. Đặng Bảo Trung
dbtrung@hcmut.edu.vn
Applied Analytical Chemistry Group
Faculty of Chemical Engineering

Assessment:

- Project: 30% (2-3 students / group)
- Final examination: 70% (multiple-choice / writing)
- Books and calculator are allowed

INTRODUCTION

- Missions
  - Qualitative analysis
  - Quantitative analysis
- Methods
  - Chemical analysis
  - Instrumental analysis
- Lab. skills
- Applications

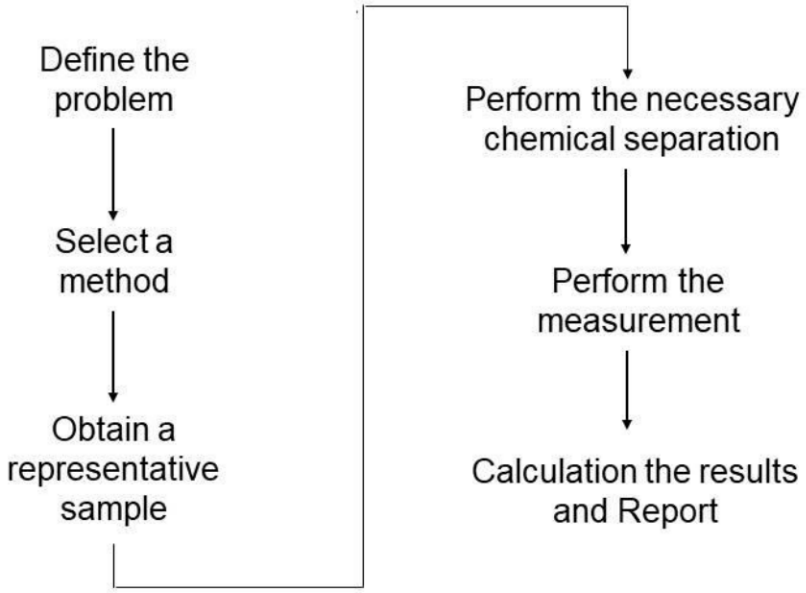
Analysis methods

Chemical analysis	Instrumental analysis
Analyte: 10^{-2} – 10^{-4} M	Analyte: < 10^{-4} M
Long working time	Quick and automatic work
Simple tools	Expensive instruments
High accuracy	Quite high accuracy
Low selectivity	High selectivity

Classification of analysis methods

- Chemical analysis
- Physical analysis
- Physical chemical analysis / Instrumental analysis
  - Spectrometry
  - Chromatography
  - Electrochemical analysis

The analytical process



5

The analytical process

– Qualitative or Quantitative analysis?
– Selection of analysis method

- Type of analysis sample
- Concentration
- Instrument
- Method

6

The analytical process

– Select the representative sample

– Prepare the sample

– Performance → ✓ Replicates ✓ Blank samples

– Calculation

– Data treatment and report → ✓ Significant figures ✓ Measurement uncertainty

Concentrations of solution

– Percent concentration: w/w (%), v/v (%), w/v (g/L, mg/L)

– Molarity: C_M (mol/L, M)

– Normality: C_N (eq./L, N)

– Parts per million concentration: C_{ppm} (ppm)

1 ppm = 1 mg/kg	Solid sample
1 ppm = 1 mg/L	Liquid sample
1 ppm = 1000 ppb	ppb – parts per billion