



PROGRAMS AND BIBLIOGRAPHY

Subject	
Code	Name
QA218	Analytical Chemistry

Vector
OF:S-5 T:002 L:003 P:001 O:000 D:000 HS:006 SL:006 C:006 AV:N EX:S FM:75%

Pre requirement
QG101/QG109

Summary
Chemical equilibrium. Acid-base equilibrium. Solubility equilibrium. Equilibrium of complexation. Oxidation-reduction equilibrium. Qualitative and quantitative analysis. Gravimetry. Volumetry. Expression of analytical results.

Program
<p>THEORY: General aspects of qualitative analysis and quantitative analysis. Statistics in analytical chemistry: significant digits, errors, propagation of errors, data processing, rejection of results. Chemical equilibria. Buffer solution. Volumetric analysis. Volumetry of neutralization. Indicators. Titrations of acids and bases. Titration curves. Oxidation reduction reactions. Balancing. Batteries or galvanic cells. Salt bridge. Electrode potential. Nernst equation. Most used applications and reactions in redox titration. Redox volumetry. Indicators. Direct and indirect titrations. Titration curves. Equilibria of complexation. EDTA. Applications. Volumetry of complexation. Indicators. Effects of pH, use of buffers. Interferences in titrations with EDTA. Masking agents. Titration curves. Solubility products. Fractional precipitation. Volumetry of precipitation. Indicators. Mohr method. Volhard method. Fajans method. Titration curves. Physical nature of precipitates. Contamination of precipitates. Gravimetric analysis: conventional precipitation and from homogeneous solution.</p> <p>EXPERIMENTAL: Identification and separation reactions of cations and anions. Calibration of volumetric pipette. Gravimetric determination of nickel with dimethylglyoxime. Volumetric neutralization. Preparation and standardization of NaOH solution. Determination of HCl and acetic acid. Preparation and standardization of HCl solution. Determination of NaOH and NH₃. Precipitation Volumetry. Methods of Mohr and Volhard. Determination of chloride. Volumetry of complexation. Preparation of EDTA solution. Determination of Ca²⁺. Interferences study. Redox volumetry. Permanganometry. Preparation and standardization of KMnO₄ solution. Analysis of commercial hydrogen peroxide.</p>

Bibliography

1. Baccan, N.; Godinho, O.E.S.; Aleixo, L.M.; Stein; E., *Introdução a Semimicroanálise Qualitativa*, 7ª edição, Editora UNICAMP, Campinas, 1997.
2. Baccan, N.; de Andrade, J.C.; Godinho, O.E.S.; Barone, J.S., *Química Analítica Quantitativa Elementar*, 3ª Edição (3ª reimpressão), Editora Edgard Blücher, São Paulo, 2005.
3. Skoog, D.A.; West, D.M.; Holler F.J.; Crouch, S.R., *Fundamentos de Química Analítica*, Tradução da 9ª Edição Norte-Americana, Thomson Learning, São Paulo, 2014.
4. Harris, D.C., *Análise Química Quantitativa*, 8ª Edição, LTC, Rio de Janeiro, RJ, 2012.
5. Vogel, Arthur I. *Química Analítica Qualitativa*, 5ª Edição, Mestre Jou, São Paulo, 1981.

Evaluation criteria

Evaluation criteria defined by the teacher, based on the provisions of Section I - General Rules, Chapter V - Student Assessment in Discipline, of the General Undergraduate Regiment. Frequency: 75% (* The absences will be considered within the provisions of chapter VI, section X, article 72 of the General Undergraduate Regulations)