



PROGRAMS AND BIBLIOGRAPHY

Subject	
Code	Name
QA282	Classical Chemistry

Vector
OF:S-5 T:004 P:000 L:004 O:000 D:000 HS:008 SL:008 C:008 AV:N EX:S FM:75%

Pre requirement	QG108 QG109
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Summary
Ionic equilibrium, acid-base, complex ions, oxidation and reduction. Solubility and solubility product. Qualitative and quantitative analyses. Volumetry. Gravimetry. Expression of analytical results.

Program
<p>THEORY: General aspects of qualitative and quantitative analyses. Significant digits, accuracy and precision. Physical characteristics of precipitates. Precipitates contamination. Gravimetric analysis: conventional precipitation and from homogeneous solution. Chemical equilibria. Electrolyte effect on the chemical equilibria. Solubility products. Fractional precipitation. Volumetric analysis: general principles, applications and reactions. Volumetric precipitation: indicators, Mohr's method, Volhard's method, Fajans' method and titration curves. Acid-base equilibria. Buffer solution. Neutralization volumetry: indicators, acid and bases titrations, polyprotic acids and titration curves. Oxidation reduction reactions. Balancing. Electrochemical cells. Salt bridge. Electrode potential. Nernst equation. Most used applications and reactions in redox titration. Redox volumetry: indicators, direct and indirect titrations, titration curves. Permanganometry. Iodometry. Dichromatometry. Complexation equilibria. EDTA. Applications. Complexation volumetry: indicators, effects of pH, buffers usage, interference in titrations with EDTA, masking agents and titration curves.</p> <p>EXPERIMENTAL: Laboratory techniques. Solutions preparation. Stoichiometry. Anions and cations identification reactions: Cl^-, SO_4^{2-}, NO_3^-, CO_3^{2-} and NH_4^+. Pipette calibration. Gravimetric analysis by precipitation from homogeneous solution. Volumetric precipitation: Mohr's and Fajans' methods and samples analysis. Buffer solutions and buffer capacity. Neutralization volumetry: preparation and standardization of NaOH and HCl solutions. Indicators test and samples analysis. Spreadsheets: species distribution. Redox volumetry: permanganometry and iodometry. Preparation and standardization of KMnO_4 and $\text{Na}_2\text{S}_2\text{O}_3$ solutions. Samples analysis. Complexation equilibrium: reactions of ions in aqueous medium. Complexation volumetry: EDTA solution preparation. Determination of Cu^{2+} and Zn^{2+} in brass. Masking agents.</p>

Bibliography

1. Baccan, N.; Godinho, O.E.S.; Aleixo, L.M.; Stein, E., *Introdução a Semimicroanálise Qualitativa*, 7ª edição, UNICAMP, Campinas, 1997.
2. Vogel, Arthur I. *Química Analítica Qualitativa*, 5ª edição, Mestre Jou, São Paulo, 1981.
3. Baccan, N.; de Andrade, J.C.; Godinho, O.E.S.; Barone, J.S., *Química Analítica Quantitativa Elementar*, 3ª edição, Edgard Blücher, São Paulo, 2005.
4. 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.
5. Harris, D.C., *Análise Química Quantitativa*, 8ª edição, LTC, Rio de Janeiro, RJ, 2012.
6. BAGNO, Marcos. A norma oculta – língua e poder na sociedade brasileira. São Paulo: Parábola Editorial, 2003.
7. KOCH, Ingedore Vilaça e ELIAS, Vanda Maria. Ler e escrever: estratégias de produção textual. São Paulo: Contexto, 2009.
8. RENDA, Vera. Redação acadêmica: do posicionamento autoral (papel de autor) à produção do gênero acadêmico. Leitura e produção escrita na graduação: pesquisa e ensino. Taubaté, SP: Cabral, 2011.
9. THEREZO, Graciema Pires. Redação e Leitura para Universitários. Campinas: Alínea, 2014.

Evaluation criteria

For grading policy, see: Regimento Geral de Graduação, Seção I – Normas Gerais, Capítulo V – Da Avaliação do Aluno na Disciplina. Students are required to attend 75 % of the lectures. For further details, see: Regimento Geral de Graduação, capítulo VI, seção X, artigo 72.