

Course description

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|-----------------------------|------------------------------------------|-----------------|------------------|
| Course abbreviation: | KCH/LCRTG | Page: | 1 / 3 |
| Course name: | Practical Laboratory Work - X-Ray Diffra | | |
| Academic Year: | 2016/2017 | Printed: | 22.05.2018 10:11 |

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|-----------------------------------------|-------------------------------------------------------|---------------------------|-----------------|
| Department/Unit / | KCH / LCRTG | Academic Year | 2016/2017 |
| Title | Practical Laboratory Work - X-Ray Diffra | Type of completion | Pre-Exam Credit |
| Long Title | Practical Laboratory Work - X-Ray Diffraction Methods | | |
| Accredited/Credits | Yes, 3 Cred. | Type of completion | Oral |
| Number of hours | Cvičení 2 [Hours/Week] | | |
| Occ/max | Status A | Status B | Status C |
| Summer semester | 0 / 0 | 0 / 0 | 0 / 0 |
| Winter semester | 10 / - | 0 / 0 | 0 / 0 |
| Timetable | Yes | | |
| Language of instruction | Czech | | |
| Substituted course | None | | |
| Preclusive courses | N/A | | |
| Prerequisite | N/A | | |
| Informally recommended courses | N/A | | |
| Courses depending on this Course | N/A | | |

Course objectives:

Aims

The exercise content is focused on experimental obtaining of X-ray patterns (diffractometer INEL) and their interpretation. The students have possibility to carry out qualitative phase diffraction analysis with use of database PDF ICDD and by means of internal standard methods quantitative analysis, too.

Requirements on student

Requirements

Satisfying the requirements to obtain credit.

Bases of crystallography, physics and chemistry of solids

Evaluation of the subject as well as the exam grading is made according to the articles No 31 - 33 in the Regulations on Study and Examinations University of Ostrava

Content

Content

The content is based on following items:

1. Crystal lattice (choice of basic cell, indexes, calculation related to lattice geometry and transformation)
2. Atomic structure of crystals (PC imagination of crystal structures, calculation of interatomic distances)
3. Sources and detector systems of X-rays radiations (practical demonstration)
4. Monocrystal methods of X-ray diffraction (picture taking, basic evaluation)
5. Powder methods of X-ray diffraction (samples preparation)
6. Powder methods of X-rays diffraction (pictures taking)
7. Qualitative powder X-ray diffraction analysis (identification of phases)

8. Quantitative powder X-ray diffraction analysis (phase content determination in model mixtures)
9. Lattice parameters and their determination (recording, evaluation)

Prerequisites - other information about course preconditions

none

Competences acquired

Competences

The students know to prepare experimental background for execution of qualitative and quantitative X-ray analyses of mineral mixtures samples.

The students can independently interpret X-rays patterns with regard to qualitative and quantitative analysis of measured sample.

Fields of study

Guarantors and lecturers

- **Guarantors:** Ing. Vlastimil Matějka, PhD.
- **Tutorial lecturer:** Ing. Vlastimil Matějka, PhD.

Literature

- **Recommended:** I.Kraus. *Úvod do strukturní rentgenografie, Academia, Praha, 1985..*
- **Recommended:** V.Valvoda, M.Polcarová, P.Lukáč. *Základy strukturní analýzy, Karolinum, UK Praha, 1992..*

Time requirements

| Activities | Time requirements for activity [h] |
|----------------------------------------------------------------|------------------------------------|
| Being present in classes | 26 |
| Unaided e-learning tasks completion | 35 |
| Consultation of work with the teacher/tutor (incl. electronic) | 14 |
| Total: | 75 |

assessment methods

professional knowledge

Continuous analysis of student's achievements

teaching methods

professional knowledge

Briefing

Demonstration

Kinetic and practical skills training

learning outcomes

professional knowledge - knowledge resulting from the course:

Competences

The students know to prepare experimental background for execution of qualitative and quantitative X-ray analyses of mineral mixtures samples.

The students can independently interpret X-rays patterns with regard to qualitative and quantitative analysis of measured sample.

Course is included in study programmes:

| Study Programme | Type of | Form of | Branch | Stage | St. plan v. | Year | Block | Status | R.year | R. |
|-----------------|--------------------------|-----------|----------------------------------------|-------|-------------|------|---------------------|--------|--------|----|
| Chemistry | Postgraduate e Master | Full-time | Analytical Chemistry of Solid Phase | 1 | 2013 | 2016 | Povinné předměty | A | 2 | ZS |