

Midwestern Association of Chemistry Teachers in Liberal Arts Colleges

Thirteenth Annual Meeting - Lake Forest College - Oct. 23, 1964

Proceedings of Discussion Group 3A: Content of the Advanced Inorganic Course

During the discussions of this group several questions were raised. These will be listed with a brief summary of the discussion which followed.

Q. What are most of the schools here represented offering as an Advanced Inorganic Course?

1. Most offer a two or three credit lecture course in the junior or senior year. A few offer either a one or two credit laboratory session to accompany the lectures. These laboratory courses are mostly inorganic preparations with emphasis on different techniques of synthesis.

Q. Is Physical Chemistry a prerequisite for the Advanced Inorganic course?

2. Most schools answered yes. It was pointed out that this seemed to be a necessity in view of the requirements of the ACS Committee on Professional Training. It was further pointed out that this prerequisite usually prevents any major other than chemistry from enrollment.

Q. What topics from Physical Chemistry are considered essential prerequisites?

3. Most agreed that a thorough knowledge of thermodynamics was needed before studying Advanced Inorganic. Some felt a knowledge of quantum mechanics was a necessity; others felt that merely an acquaintance with the symbolism and vocabulary of quantum mechanics was enough.

Q. Is there not over-lap in the topics covered in Physical Chemistry and Advanced Inorganic?

7. Most felt there was an over-lap, e.g. quantum mechanics, chemical bonding, kinetics and mechanisms, redox considerations. Some, however, felt that this was necessary since these topics are treated from a different point of view in each course.

Q. What texts are being used for these courses?

5. The inorganic texts of Gould, Cotton and Wilkinson, Sienko and Plane ("Physical-Inorganic Chemistry"), Heslop and Robinson were all mentioned. Many, however, supplement a text with other references, including journal references.

Q. What main topics should be covered in an Advanced Inorganic course?

4. Atomic Structure, Chemical Bonding (ionic and covalent), Redox, Coordination Chemistry, Mechanisms, Ligand Field (spectra), Acid-Base, Solid state (crystallography), Radiochemistry, Synthetic Methods.

Q. Should any of these topics be given higher priority than others?

Many felt that an answer to this question would vary with each teacher since the topics considered important by an individual teacher are usually those he knows best. Perhaps Solid State and Radiochemistry could be given lower priority than others on the list.

- Q. Does not the Advanced Inorganic course include too much Physical Chemistry? Where is descriptive inorganic chemistry now taught in the undergraduate curriculum?

This question prompted much discussion and it was felt that there is a definite lack in the teaching of descriptive chemistry. It would seem that students entering graduate schools are penalized on inorganic qualifying exams because of this lack. One school offers Inorganic Chemistry, mostly descriptive chemistry of the elements, the second semester of the freshman year followed by the more theoretical Advanced Inorganic in senior year. One suggestion was made that the descriptive chemistry of the elements in at least one of the Groups of the periodic table be covered in complete detail; others thought such specialization could wait until graduate school.

- Q. Should areas of research currently being covered in the scientific journals influence the topics to be discussed in Advanced Inorganic?

Some felt this investigation of current research should be left for graduate school, that undergraduate courses should merely prepare for such specialization by giving students the necessary vocabulary. Some schools cover current research in a Special Topics Seminar.

- Q. Is there not a greater need for Advanced Inorganic laboratory work?

It was pointed out that often laboratory assistants get greater practical knowledge of laboratory procedures, e.g. preparing solutions) than any course teaches. Perhaps the Advanced Inorganic laboratory course should fill this need for those who are not laboratory assistants. The laboratory text by Jolly was strongly recommended to encourage independent laboratory work. Some felt that this practical knowledge was best gained through an undergraduate research project.

Discussion Leader: Jim Finholt, Carleton College.