
Research in Chemical Education 4

260/262 Scheman

Organized by Renee Cole and Christopher Bauer

- 1:30 **Renee Cole:** Presiding and Introductory Remarks
- 1:35 **S360 Scott Lewis:** Identifying At-Risk Students in General Chemistry:
A Comparison of a Formal Thought Measure and a General Aptitude Measure
- 2:00 **S361 Yilmaz Saglam:** Cross-Cultural Study: Middle School Students' Beliefs about Matter
- 2:25 **S362 Ayhan Yilmaz:** Investigating Students' Abilities to Solve Algorithmic Problems
and Their Understanding in Chemistry Concepts
- 2:50 Break
- 3:00 **S363 Jennifer Claesgens:** "Is There a Specific Weight for the Mole?"
Students' Initial Ideas about Amount of Substance Prior to Instruction
- 3:25 **S364 Matthew Arthur:** Development of an Interview Protocol to Evaluate How Students
from a General Education Course Picture Covalent Molecules
- 3:50 **S365 David Meltzer:** Investigations of Student Learning
in Thermochemistry and Thermal Physics

S365 Investigations of Student Learning in Thermochemistry and Thermal Physics. *David Meltzer, Iowa State University, Ames, IA 50011, 515-294-9358, dem@iastate.edu; Thomas J. Greenbowe, Iowa State University, Ames, IA 50011*

We have carried out a series of investigations into student learning of topics in thermochemistry and thermal physics, including calorimetry in both chemical and physical contexts. A wide range of data was analyzed, including student answers on free-response exams, students' written explanations of their reasoning on short problems involving qualitative reasoning, and extended one-on-one interviews with students. We have found significant learning difficulties related to fundamental concepts including the first and second laws of thermodynamics, behavior of systems undergoing cyclic processes, and the origin of heat transfer in chemical reactions. We have begun development and testing of curricular materials based on this research, aimed at helping students resolve some of these learning difficulties.