

**Stony Brook University
The Graduate School**

Doctoral Defense Announcement

Abstract

Experienced High School Chemistry Teachers' Conceptions of Chemical Equilibrium in
Terms of Rates of Reaction

By

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Much research has been conducted about student alternative conceptions in chemistry, and a significant amount of work has focused on the areas of chemical equilibrium and reaction rates. Less research has addressed teachers' alternative conceptions in these areas, and most of this work has studied the conceptions of pre-service and novice chemistry teachers. Teachers' understanding of chemistry concepts, as well as the way they integrate these topics, play a crucial role in their ability to teach for understanding and promote student conceptual change. This study investigated experienced high school chemistry teachers' conceptions about chemical equilibrium as it relates to reaction rates. Thirteen experienced teachers of advanced (AP and IB) chemistry completed the Chemical Equilibrium Concepts Test [CECT] and participated in interviews containing graphing tasks. Information about the teachers' conceptions of equilibrium and reaction rates was collected, as well as information about how these topics were integrated in their classrooms. The teachers in the study had many of the same alternative conceptions held by students and pre-service/novice teachers. The concepts of reaction rates as they relate to chemical equilibrium were not well understood. The teachers had difficulty describing changes to an equilibrium system in terms other than the statements of Le Châtelier's principle and were generally unable to draw accurate concentration and rate graphs for these changes. Those teachers who held chemistry primary certification were better able use reaction rates to describe equilibrium, scored higher on the CECT and maintained fewer alternative conceptions. The results of this study have implications for chemistry education. A greater focus on the integration of chemistry topics is needed in textbooks and in course curricula. Teacher training and professional development should include courses that emphasize the interconnectedness of chemistry topics, and research that has been conducted about alternative conceptions of both teachers and students.

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