

## **Root Cause Analysis and Method Development of Calorimetry Experiments**

First year chemistry students learn a broad range of concepts that are also proven out in the lab environment. These concepts are a basis for a solid foundation for future chemistry learning. When the lab experiments don't produce the expected results, students understanding in these concepts diminish and overall confidence and grades suffer. Our project details the root cause analysis and subsequent method development work for two experiments related to calorimetry; heat of solution and freezing point depression. The team sought to refine these experiments after finding that many of the students were unable to generate the expected results for the experiment. The focus of the work was twofold; 1) determine the cause of the failures and 2) recommend and validate changes to the current experiments. Isolating and mitigating the issues impacting these experiments should provide future students with a deeper understanding of chemistry and how it is applied to various situations.