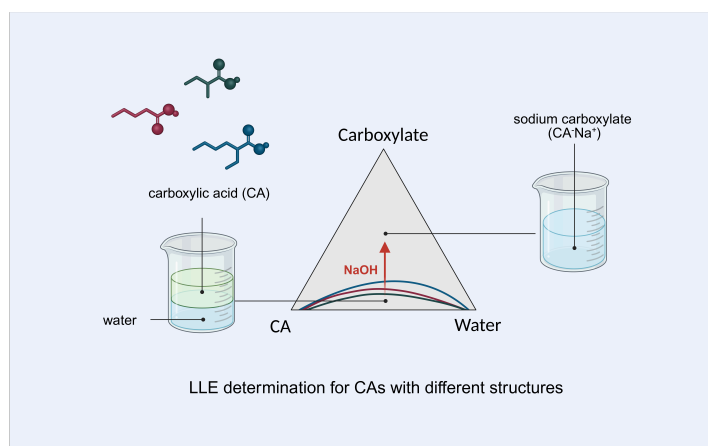


Master's Thesis

Chemical and phase equilibria of carboxylic acid-based switchable hydrophilicity solvents

Background In the context of green chemistry, finding safer and more sustainable alternatives to traditional solvents is a top priority. Recently, Switchable hydrophilicity solvents (SHSs) have gained attention as replacements for volatile organic solvents in the extraction of valuable hydrophobic molecules. SHSs are liquid mixtures that can reversibly switch between a biphasic and a hydrophilic monophasic state in response to a chemical trigger. For carboxylic acid (CA)-based SHSs, the addition of an inorganic base to a biphasic water + CA mixture triggers the formation of a monophasic hydrophilic phase due to the formation of carboxylates. However, the delicate interplay between the SHSs' chemical equilibrium (CE) and liquid-liquid equilibrium (LLE), and how these are influenced by the CA's molecular structure, remain poorly understood.



Thesis Description This experimental thesis will investigate the effect of the CA's molecular structure on the CE and LLE of carboxylic acid-based SHSs. The student will:

- Measure the LLE diagram of CA + water + NaOH systems prepared from CAs with different molecular structures
- Measure the CE constant of the acid-base reaction in the CA + water + NaOH systems at different monophasic compositions
- Determine the effect of the CA's molecular structure on the LLE and CE

Requirements:

- Strong self-motivation and ability to work independently
- Background in chemical engineering, chemistry or related field
- Experience with gas- and ion-chromatography beneficial but not required

Start date: Immediately

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