Assignment #5: Searching, Bibliography & Database

A detergent is an agent that purifies or cleanses and (bio)chemical detergents are ambiphiles with a hydrophilic polar head group attached to a nonpolar hydrocarbon chain. Ambiphiles reduce the surface tension of water, emulsify, and aid in the solubilization of soil. Select a detergent / ambiphile from the following list:

Soaps from Lard, Coconut Oil and Avocado Oil (Fatty Acid Soap, see http://www.soap-making-resource.com/saponification-Soap-table.html), Sodium Dodecyl (Lauryl) Sulfate (Anionic Alkyl Sulfate), Sodium Dodecylbenzenesulfonate (Anionic Sulfonate Soap), Dodecylamine Hydrochloride (Cationic Alkyl Ammonium Salt), Hexadecyltrimethylammonium Chloride / Bromide (Cationic Alkyl Ammonium Salt), Sodium Lauryl Ether Sulfate (Alkyl Ether Sulfate Soap), Pentaerythrityl Palmitate (Non-Ionic Detergents), Fatty Alcohol Ethoxylates (Non-Ionic Detergents, see http://www.chemicalassociates.com/fatty_alcohol_ethoxylates.html), Empigen BB (Neutral Betaine Detergent), Cocamidopropyl Betaine (Neutral Betaine Detergent), Bile Salts (Sodium Glycocholate and Taurocholates, Intestinal Natural Detergents), Glycerolphospholipid (Cell Membrane Bilayers), Phosphosphingolipids (Cell Membrane Bilayers), Polybuteneamine & Polyetheramine Detergents* (PBA / PEA Gasoline Additives), Mannich Base Detergents* (Gasoline Additive), and Amphipols* (Protein Solubilization).

Leading references will be provided for items marked "*". The selection of other topics is possible and can be considered in consultation with the instructor. Your topic selection needs to be registered with the instructor to avoid redundancy. Answer the following questions for the detergent / ambiphile of your choice.

(a) Chemical Identity & Function (Section #1). Search the literature and (1) learn the chemical name of the detergent / ambiphile and common synonyms, (2) find the chemical structure (if pure) or of the chemical structures of the most important compounds (if mixture) contained in the detergent / ambiphile, (3) learn about the suggested / best uses, (4) find the common / typical concentration when used in a typical application, and (5) take note of any potential problems (hazards, errors). Write one paragraph, show the structures in a Scheme (use ChemDraw), and cite your sources as endnotes.

(b) Spectroscopic Characterization (Section #2). Research the literature and locate the following spectra for the detergent / ambiphile of your choice: (1) ^{1}H-NMR spectrum, (2) ^{13}C-NMR spectrum, (3) UV/Vis spectrum, and (4) results of one more analytical method of your choice.

Import the spectra (images) into Word and show the spectra as Figures or list spectroscopic data in "one-dimensional table" format (i.e., as in an experimental section of a journal article). Write a very brief experimental section in which you describe how the spectra were recorded. Cite your sources as endnotes.

(c) Structure Search & Synthesis (Section #3). Perform a structure search and find literature on the synthesis of the detergent / ambiphile of your choice. List up to a total of five "leading references" to the various possible syntheses. Then pick one of the syntheses and list pertinent references (up to five) for this specific synthesis. Write one paragraph, show the synthesis you picked in a Scheme (use ChemDraw), and provide references as endnotes.

Submission & Deadline: The assignment must be completed with MS Word with *JOC* formatting. Submit one Word file "A05_'your name'.docx" with three sections (each section starts on a new page, endnotes are listed after each section with continuous endnote numbering) by Tuesday, 02/28/12, midnight. Bring one hardcopy to class on Wednesday, 02/29/12.