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CHANGE NATURE OF CHEMICAL REACTIONS DURING DILUTE INTERFACE

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Abstract: *The study of chemical reactions at dilute interface using microfluidics is species in organic rich compound is a very significant problem. This type of compound is widely spread all over the world. It is characterized by a high content of humic substances, high color of compound and low pH. In this regard, a certain determination of silicon concentration in this type of compounds is impossible without a preliminary investigation of silicon species. The aim of this research is therefore an investigation of the ratio of silicon dissolved forms in organic-rich compounds depending on the silicon concentration and the acidity of the compound.*

Keywords: *Silicon, Organic compound, low pH, Rich Compound*.

1. Introduction

Natural compound enriched with silicon occurs as a result of alumosilicate rock weathering, destruction of vegetal chemical change or chemical reaction is a process in which one or more pure substances are converted into one or more different pure substances. Chemical changes lead to the formation of substances that help grow our food, make our lives more productive, cure our heartburn, and much, much more. Now that you understand the basic structural differences between different kinds of substances [1, 3], you are ready to begin learning about the chemical changes that take place as one substance is converted into another. Chemical changes are chemists' primary concern. They want to know what, if anything happens when one substance encounters another. Do the substances change? How and why? Can the conditions be altered to speed the changes up, slow them down, or perhaps reverse them? Once chemists understand the nature of one chemical change [2, 4], they begin to explore the possibilities that arise from causing other similar changes. For example, let's pretend that you just bought an old house *as is*, with the water turned off. On moving day, you twist the hot water tap as far as it will go, and all you get is a slow drip, drip, drip. As if the lack of hot water weren't enough to ruin your day, you also have a toothache because of a cavity that you haven't had time to get filled. As a chemist in training, you want to know what chemical changes have caused your troubles. Chemical changes, like the ones mentioned above, are described with chemical equations Conventional wastewater treatment techniques, such as trickling filtration, activated sludge, anaerobic digestion, and chlorination have been reported to have little effect on water.

In chemical reactions, atoms are rearranged and regrouped through the breaking and making of chemical bonds. For example, when hydrogen gas, $H_2(g)$, is burned in the presence of gaseous oxygen, O2(g), a new substance[5, 6], liquid water, $H_2O(l)$, forms. The covalent bonds within the H_2 molecules and O2 molecules break, and new covalent bonds form between oxygen atoms and hydrogen atoms.

A chemical equation is a shorthand description of a chemical reaction. The following equation describes the burning of hydrogen gas to form liquid water.

$$2H_2\,(g) + O_2\,(g) \rightarrow 2H_2O\,(l)$$

2. Atmospheric Nature

The atmosphere contain mixture of gasses, including oxygen molecules O2 and ozone molecules, O , that play a very important role in protecting the earth from the sun's high-energy ultraviolet radiation. The ultraviolet portion of the sun's energy spectrum can be divided into three parts: UV-A, UV-B, and UV-C. Not all UV radiation is harmful. UV-A, which includes radiant energy of wavelengths from about 320 to 400 nm, passes through the stratosphere and reaches us on the surface of the earth. We are glad it does, because UV-A radiation provides energy that our bodies use to produce vitamin D. The shorter-wavelength UV-B radiation (from about 290 to 320 nm) has greater energy than the UV-A radiation. Some UV-B radiation is removed by the gases in the stratosphere, but some of it reaches the surface of the earth. Radiation in this portion of the spectrum has energy great enough that excessive exposure can cause sunburn, premature skin aging, and skin cancer.

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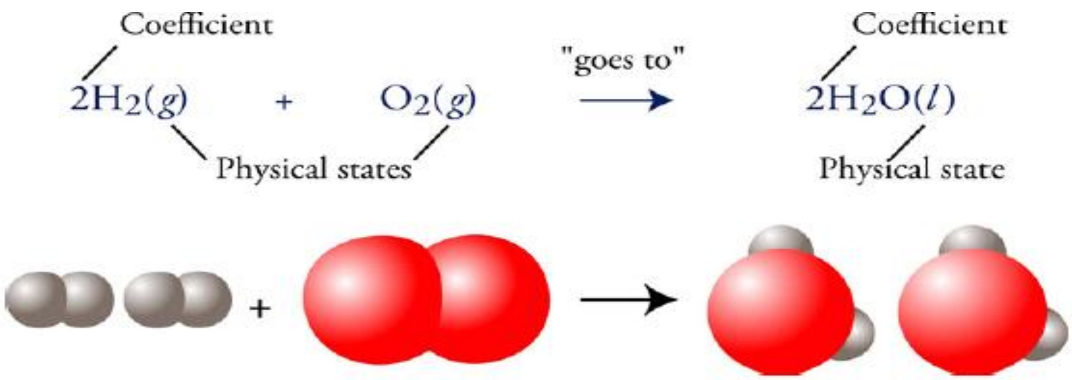

Figure 1: Rich compound rectification using dilution

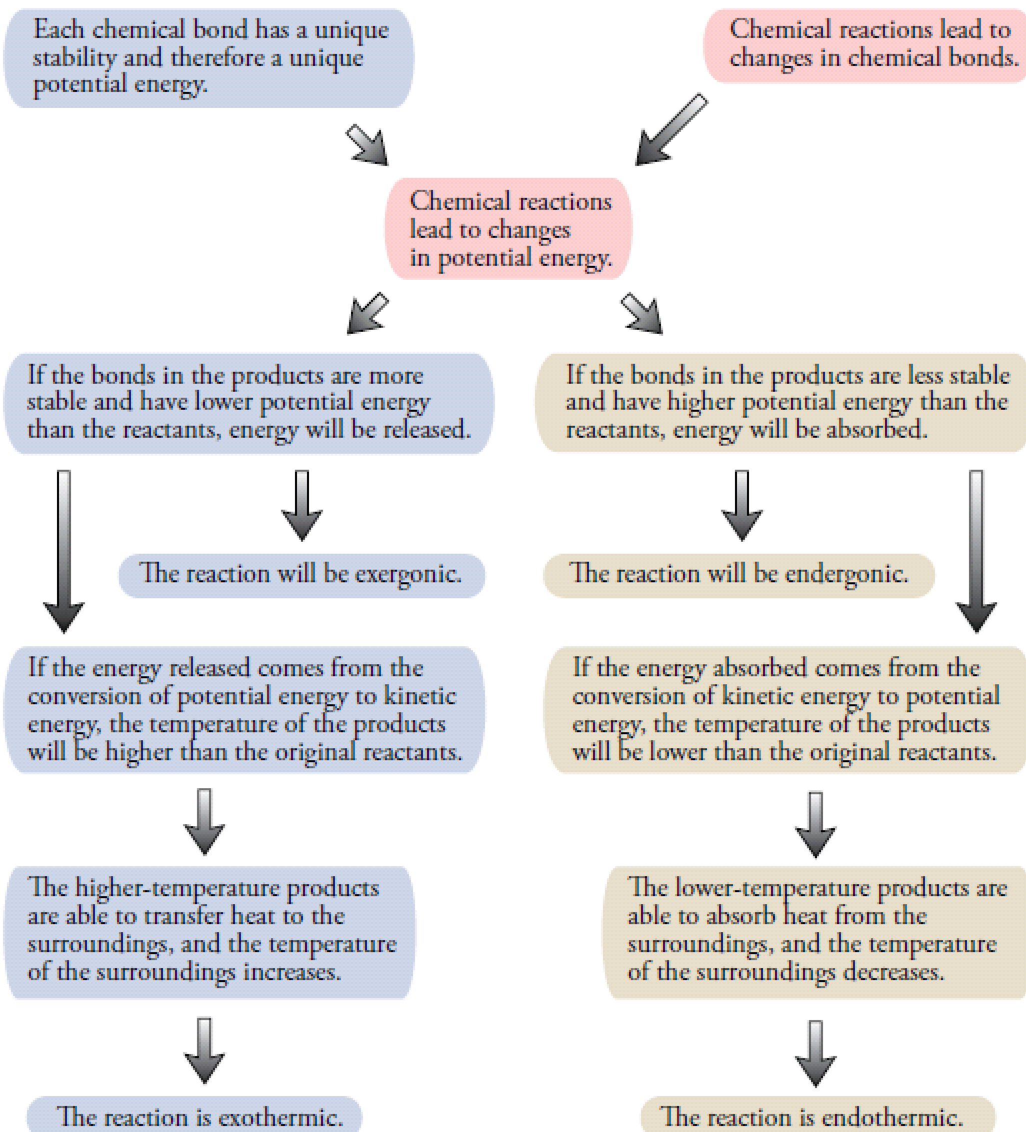

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Figure 1.1: Flow chart processes of rich compound

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The highest-energy ultraviolet radiation is UV-C, with wavelengths from about 40 to 290 nm. We are very fortunate that this radiant energy is almost completely removed by the gases in the atmosphere, because UV-C is energetic enough to cause serious damage [7] not only to us but to all life on earth. One reason it is so dangerous is that DNA, the substance that carries genetic information in living cells, absorbs UV radiation of about 260 nm. Likewise, proteins, which are vital structural and functional components of living systems, absorb radiation with wavelengths of about 280 nm. If these wavelengths were to reach the earth in significant quantity, the changes they would cause by altering DNA and protein molecules would lead to massive crop damage and general ecological disaster.

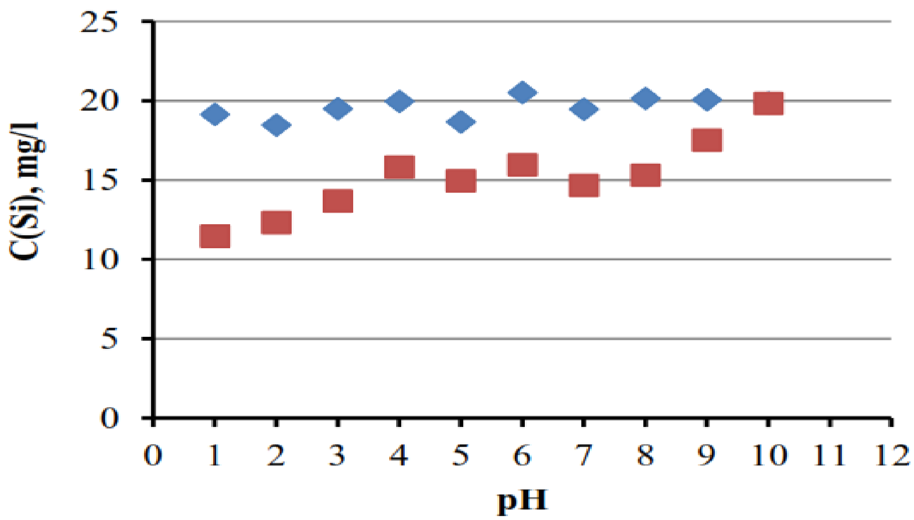

Figure 1.2: pH value of rich compound

A comparative study of the silicon concentration in the first model solution with different pH was carried out in order to identify pH influence on silicon forms in a water solution. Molecular spectrophotometry (SP) and atomic absorption spectrometry were used. The silicon concentration determined by SP method in a model solution with pH of 1-9 is much less than that determined by AAS method (Fig. 1). These different results can be explained by the presence of polymer forms of silicic acid not detected by spectrometry. The greatest difference of silicon concentrations detected by both methods is observed in the solution with low pH (pH<5). According to [16], the rate of silicon acid poly merization increases with the growth of hydrogen ion concentration. In the solution with pH>10 the silicon concentration measured by both methods SP and AAS is the same as initial one (20±2.2 mg/L). It is an evidence of the presence of monomeric and dimeric forms of silicic acid and products of its dissociation.

pH	TDS, mg/l	Concentration, mg/l									
		CO_2	HCO_3^-	SO_4^{2-}	Cl^-	Ca^{2+}	Mg^{2+}	Na^+	K^+	FA	HA
3.66	30.56	68.60	<3.00	11.80	2.24	6.00	1.22	0.35	0.37	105.01	4.87
3.72	45.54	60.30	<3.00	27.00	2.08	5.60	1.46	0.35	0.75	113.09	4.87
3.75	35.99	66.00	<3.00	19.17	2.02	6.00	1.22	0.40	0.43	107.91	3.89
3.72	35.18	57.20	<3.00	16.00	2.24	6.00	1.22	0.39	0.36	91.44	3.08
3.75	40.66	61.6	<3.00	23.40	2.35	4.40	1.22	0.79	0.86	100.33	4.10
3.80	29.40	5.37	<3.00	12.20	2.02	5.00	1.22	0.45	0.44	98.47	3.08

Figure 2.0: pH value at different dilute stage of different compound

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3. Dilute Electron Reduction

The dilute electron is a powerful one-electron reluctant, E = -2.87 V4. The dilute electron is characterized by an electron surrounded by a shell of 5 water molecules, and is also known as the hydrated or equated electron202. The dilute electron can reduce most halogenated contaminants at near diffusion-controlled rates. The electron tunnelling leads to activation energies for reaction with halogenated organics that are invariable and small (6 to 30kJ/mol) presented. Reaction rates of the dilute electron with fluorinated compounds have been reported. Organic fluoro-saturation decreases dilute electron reduction kinetics, since fluorine doesn't have any low-lying vacant d-orbital to accept an electron. As fluoro-saturation increases the rates tend to decrease (i.e., rates are fastest for tertiary fluorocarbons, then secondary, then primary).

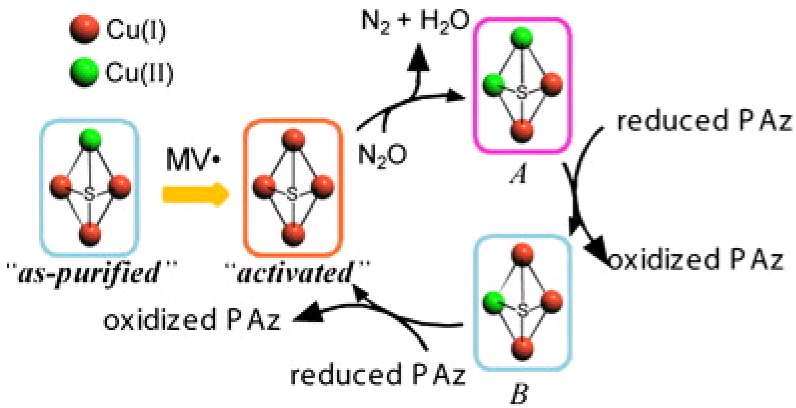

Figure 1.3: Incantation process of reaction

Dilute electrons can be produced by radiolysis, photolytic, chemical, and direct injection methods. In surface waters, the photolysis of humic materials and hard-UV photolysis of water are the most common sources of natural dilute electrons which have a steady-state concentration of 10-15 M.

4. Conclusion

It has been found that the degree of (rich compound/polymerization) of silicic acids essentially depends on the acidity of a solution. The highest rate of the (rich compound/polymerization) process catalyzed by hydrogen ions is observed in the acid medium (pH=2-4) and reaches 30-40 %. Formation of anion polymeric forms of silicic acids is intensified by hydroxyl-ions in an alkalescent medium (pH 7-8).

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