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Development Directions and Innovations of Nanochemistry

Bobilova Chinnigul Hayitovna
Senior lecturer in Karshi Engineering Economics Institute Uzbekistan, Karshi

Abstract: This article argues that nanochemistry is a part of nanotechnology, because many processes and synthesis of new materials start from atoms, molecules, groups, and nanoparticles. Nanochemistry combines natural typical living organisms and inorganic properties. Thus, on the one hand, brief information about the preparation of various materials from them at the initial stage of chemistry and nanochemistry work is given.

Keywords: Nanochemistry, nanoscience, nanoparticle, surfactants, converter, blue silver, tetraethylammonium, tetrahydroborate, nanomaterials.

The word "nanotechnology" is made up of two words: "nano" and "technology", where "nano" means something, for example, one billionth of a meter. The size of one atom is a little smaller than a nanometer. If the height of a person was equal to one nanometer, the thickness of an ordinary sheet of paper would be equal to one hundred and seventy kilometers. The word "technology" means the creation of things that are needed by humans from existing materials.

In the 21st century, nanoscience and nanotechnology, which are one of the main areas of natural science, have developed actively and rapidly. By describing fundamental phenomena, properties of relationships, and small particles, the size of nanometers has paved the way for the discovery of nanoscience. Advances in new processes, materials and devices based on nanotechnology will be revealed. In nanoscience and nanotechnology, fundamental and practical problems are closely connected, the latest achievements of theoretical and experimental physics, chemistry, biology, material science and technology are used.

Nanochemistry is an important part of nanotechnology, because many processes and synthesis of new materials start from atoms, molecules, groups and nanoparticles. Nanochemistry combines natural typical living organisms and inorganic properties. Thus, on the one hand, the work of chemistry and nanochemistry prepares various materials at the initial stage, on the other hand, chemical products are formed as a result of chemical reactions by various substances.

At the same time, we are witnessing the development of interdisciplinarity and the renewal of scientific activity in nanoscience. Despite its name, the objects studied may not only be related to miniaturization. In fact, nanoscience includes physics and biology, which are close to chemical concepts. In this, knowledge was focused on a new fundamental development. As shown by many examples in physics, chemistry and biology, the composition of 1-10 nm macroparticles and the transition characteristics of individual systems depend on physicochemical quality changes. Historically independent formation and development of fundamental trends in various branches of nanotechnology, nanoscience and many discussed work perspectives are the result.

Nanotechnology-related nanochemical syntheses, modification and stabilization of individual nanoparticles, as well as more complex processes for their self-assembly, are designed. In addition, it is noteworthy to adjust the size and shape of special nanoparticles to change the properties of the synthetic structures. The assessment of the progress of scientific research is reflected in recent literature.

Meanwhile, the attention of many scientists is directed to the development of new methods for the synthesis and stabilization of metal nanoparticles. In addition, special attention is paid to the monogrowth of particles. Chemical reduction is most widely used in the aqueous phase, including aqueous and non-aqueous media. Usually, metal salts, as well as their representative aluminum hydride, boron hydride, formaldehyde, oxalate salt and tartaric acid serve the given data. These three methods are based on the program, which is widely used due to its simplicity and usability.

As an example, we consider the synthesis of gold particles. Three solutions were prepared: in water (a) formic acid in water (b) sodium carbonate in water and diethyl ether (C) in alcohol. Then, a mixture is heated at 70°C for one hour. As a result, a gold particle diameter of 2-5 nm was obtained. The main drawback of this method is the large amount of impurities present in the colloidal system formed by gold nanoparticles, which can be reduced using hydrogen as a data converter.

In general, the potential of metal particles is determined by the potential difference: $\Delta YE = YE - Yeredox$ where YE is bait, oxidation-reduction potential of particles, Yeeredox is a solution of opposite potentials. When the particles grow, $\Delta YE > 0$, when they decrease, $\Delta YE < 0$. $\Delta YE = 0$ defines an unstable equilibrium. In fact, the ability of complex metal particles depends on the number of atoms of the redox state. Concurrent data persistence functionality has become widely used. These three ratios are carried out in chemical reductions in thermodynamic and kinetic systems. Chemical reduction is a multifactorial process. It depends on the oxidation-reduction pair, concentration of components, temperature, pH factor, mainly sorption and scattering. Recently, processes have been created that simultaneously act as stabilizers, which are widely used. They contain thiols, nitrate salts and polymers containing a large number of surfactants N and S, as well as functional groups.

Metal hydroxide tetrahydroborate (MBH_4) is a commonly used reagent for metal ions, as are acidic, neutral, and alkaline aqueous SMIs. Tetraborate with an alkali metal reduces the transition of heavy metals and many cations, especially at high oxidation-reduction potential MBH4 is explained and compared to the standard potential of most metal ions, it lies in the range $-0.5 \leq -YE \leq = -1.0$ V. Given the formation of interconnected complexes of metal ions, the M ··· H ··· B bond confirms the subsequent transfer of a hydrogen atom, the cross-linking, the subsequent oxidation-reduction process with the decomposition of B-H indicates the commitment to give BH3. The separation column is catalytically hydrolyzed on the surface of the obtained metal particles.

Information about the synthesis of nanoparticles in liquid metals is given in the mass media. In the synthesis of various organic substances, solid hydrazine, the use of crystallization process and heat expansion are involved, as well as gas-solid type reactions and photochemical reactions are based on comparison. However, such chemical kinetic similarity and reduction of the results are obtained based on the formal definition. This should be considered carefully. Kinetic and mechanism properties of metal nanoparticles are very complex, stabilization of such redox synthesis processes requires factor growth and further investigation. Chemical metal ion converter data can be correlated.

Through the synthesis of a stabilizing agent and the formation of a metal ion nanoparticle, the data converter reduces the electron transfer energy. In addition, the so-called electrolysis mechanism involves the transfer of electrons to the surface layer of metal particles, but growth is directly discussed. The metallic nature of the obtained particles is expressed by intense light absorption, and silver particles correspond to the plasmonic peak at 400 nm. The stability of particles depends on the environment, and their study is carried out in the presence of sulfuric acid salt. As a result of the rapid accumulation of silver particles, it causes a decrease in pH. The effect of the last factor on the stability of gold particles was less clear.

These small positively charged silver group complexes have been shown to be stabilized as polyacrylates ("blue silver"), possibly prepared in part by Ag borohydride. Oxidation products can reduce. In 4.5 years (1.2 nm) particle size was captured using polymer as a template.

New hybrid materials, surfactants (HMS) based on the oppositely charged electrolytic property, are well adhered to paper and used as nanomass media. Platinum salts form various products with sodium borohydride and hydrazine. In this case, the reduction of platinum particles with sodium borohydride gives mainly small ones with a radius of 3.2 nm, while reduction with hydrazine is shown to produce particles measuring about 40 nm. In information media, the formation of cobalt nanoparticles, the mechanism of electronic spectra in aqueous reactions is given. In the year cobalt ions aqueous $Co(ClO_4)_2$ and HCOONa chemical radiation company made solutions to reduce spherical cobalt particles with a diameter of 2-4 nm. One molecule of sodium weighs 2100 tons. acrylate can be used as a stabilizer. Any number of electrons emitted from Co^{2+} ions can be seen in the absorption peak of the nanoparticle at a wavelength of 200 nm. It is indicated to follow the use of autocatalytic mechanism in these processes.

Cobalt 200 nm nanoparticles give hydrated electrons and radical ions CO^{-2}, as a result of which the wavelength of Co^{2+} ions decreases to the peak of one absorption region. Using decomposition, it was shown that these processes are carried out by an autocatalytic mechanism.

The formation of silver particles was studied in a solution of radioactive silver nitrate salt in ethanol or 0.01 n $C_{12}H_{25}OCO_3Na$. The stability of platinum nanoparticles synthesized in media (average size 1-2 nm) was recognized by rosewood and colloidal solutions of corresponding metal hydroxide, ethylene glycol from organic substances.

Ethylene glycol prepared for dispersing amorphous selenium particles is passed through selenium acid and hydrazine. The particles to be prepared are based on a number of control surfaces that change at a temperature range of -10 +60°C. A glass made of trans-selenium is combined with iron oxide selenium particles, which can be controlled over a temperature range. 7 nm silver particles were synthesized by electrodispersion due to the attraction of a metal anode (silver plate). The reduction of silver ions in tetrabutylammonium bromide metal nanoparticles is stabilized, and as a result of their formation in one place, the cathode anode is made of platinum or aluminum. They placed spherical nanoparticles for silver on the platinum cathode. Ceiling films were produced on an aluminum cathode. When the nanoparticles were optically analyzed during the synthesis, their spectrum allowed us to conclude that the process includes an autocatalytic stage.

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