Physico-Chemical nanomaterials science

Spectrophotometric control oxidation-reduction-potential (O.R.P.) of water during its activation

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One of the characteristics of water containing dissolved molecular hydrogen (such as ionized water) is that it exhibits a negative oxidation-reduction potential (O.R.P.). Chemical reactions occurring in an aqueous solution are called redox reactions. The O.R.P. measures the capacity of a solution to either release or accept electrons from chemical reactions. The O.R.P. value, much like pH, is important for determining water quality and for water treatment processes, the perspective for modern medicine. The disease occurs when cells O.R.P. deviate from the norm (when the cells lose their negative potential). Activated water may get a negative potential, endure easily absorbed by the body and restores the negative potential of cells lost during disease. Non-contact activation methods of biological fluids without changing their chemical composition are remarkable [1]. The design we used as activator is the plastic bag inside with powdered magnesium and some water placed inside. The package sealed and immersed in the test liquid (water). During the interaction of magnesium with water inside the package generated hydrogen that diffuses through the walls outside of the package, then saturating with hydrogen water surrounding the package. As a result O.R.P. of water changes towards negative and can reach sizes "-" 600 mV. The common nowadays O.R.P. measurement method based on the use of a pair of electrodes (measuring and reference electrode). In the case of immersion of electrodes in an environment where change O.R.P., it is defined as the voltage between the electrodes, which are expressed in millivolts. We proposed a method based on spectrophotometric measurement bandwidth of an aqueous solution of a substance, such as potassium permanganate. The most sensitive to changes in the absorption spectrum solution of potassium permanganate due to changes in O.R.P. water area proved its spectrum at 525

nm, which coincides with the green LEDs strip light (525 nm). For measuring changes in light transmission test solution compared to the control we used the method of differential spectrophotometry made from us compact, stable photometer with powerful LED and silicon photodiode with a large photosensitive surface. Initially cuvette scored 10 cm^3 of water. Regulate the amount of current through the LED current and set such that the output signal after the photodiode was 1 V. The water in the cuvette replaced the little pink solution of potassium permanganate then the signal dropped to 0.4 V. Then add 1 cm^3 of water, the signal increased to 0.46 V. When the empty cells were filled with the same solution of potassium permanganate, added 1 cm^3 then catalyst signal increased to 0.47. That is, when you add the same amount of catalyst solution became more transparent than the addition of 1 cm^3 of water. So we were obtained dependent transmission of the O.R.P.

Our method provides greater speed then allows visualizing the distribution and rapid changes of O.R.P. in the liquid medium volume.

1. Prilutsky VI, Bakhir VM Electrochemically activated water: Abnormal properties, the mechanism of biological action. - M .; VNIIIMT of JSC NPO "Ekran". 1997, 228 pp. Http://www.ikar.udm.ru/sb/sb10-1.htm).