Environmental Engineering and Management Journal

February 2022, Vol. 21, No. 2, 237-245
http://www.eemj.icpm.tuiasi.ro/; http://www.eemj.eu

"Gheorghe Asachi" TechnicalUniversity of Iasi, Romania

DETERMINATION OF CHEMICAL COMPOSITION OF SURFACE WATER IN THE YELLOW RIVER BASIN

Xiaoli Gao*

Department of Chemistry and Chemical Engineering, Luliang University, Luliang 033000, China

Abstract

A determination method of chemical composition of surface water in the Yellow River Basin is proposed in this study. Firstly, twenty-four groups of surface water samples were collected, and Cl^-, SO_4^{2-}, K^+, Na^+, Ca^{2+} were measured by ion chromatograph and inductively coupled plasma emission spectrometer (ICP-AES). The oxygen isotopic composition ($\delta^{18}O$, δD) were measured by liquid water isotope analyzer. Temperature (T), pH, oxygen reduction potential (Eh), dissolved oxygen (DO), Total Dissolved Solids (TDS) and electrical conductivity (EC) were measured by multi-parameter water quality instrument. Experimental results showed that the surface water samples were alkaline. The cation content in surface water of the Yellow River was ranked as $Na^+ > Ca^{2+} > Mg^{2+} \geq K^+$ and the anion concentration was ranked as $HCO_3^- > Cl^- > SO_4^{2-} > NO_3^- > F^-$. When the runoff volume was less than 1000 m^3/s, the runoff was inversely correlated with ion concentration (in addition to K^+ and NO_3^-). When the runoff volume was more than 1000 m^3/s, the ion concentration was not related to the runoff volume. The evaporation of surface water caused the isotopic enrichment of hydrogen and oxygen. The contents of δD and $\delta 1^8O$ were raised along the flow direction. Meanwhile, δD and $\delta^{18}O$ in surface water of Wuding River formed a larger enrichment in Heihe River. Therefore, it can be concluded that the the proposed method can accurately determine the chemical composition of surface water in n the Yellow River Basin.

Key words: anion and cation, chemical composition, determination method, Yellow River Basin

Received: September, 2018; Revised final: January, 2019; Accepted: April, 2019; Published in final edited form: February 2022

* Author to whom all correspondence should be addressed: e-mail: 15835899136@163.com