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Short Communication

Direct Potentiometric Titration for Measuring Alkalinity in Seawater Samples

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DESCRIPTION

The Boehm titration's numerous processes (CO_2 removal, agitation method, endpoint determination, etc.) are carried out in diverse ways by various research organisations, making it challenging to compare the outcomes of these groups. Here, the Boehm titration endpoint determination and CO_2 expulsion procedures were standardised. Through heating, using a N_2-filled glove box, or sparging with an inert gas (N_2 or Ar), blank samples of the three Boehm reaction bases, $NaHCO_3$, Na_2CO_3, and NaOH, were tested for 100% CO_2 expulsion. Through direct titration and back-titration, Boehm titrations using NaOH as the reaction base were investigated.

It was discovered that a back-titration is desirable for all three reaction bases in order to reduce mistakes, and that both the NaOH titrant and HCl should be standardised prior to titration. Additionally, the titration must be carried out immediately after 2 hours of N_2 or Ar degassing, and degassing must continue during the titration. The NaOH reaction base is discovered to be an example of this, where the effects of dissolved CO_2 are most pronounced and long-lasting. Both the pH electrode and the endpoint measurement for colour indication are acceptable when there is sufficient CO_2 removal.

To determine the amount of carbonate carbon in geological rocks, a coulometric titration is utilised. With the addition of 2 M perchloric acid, heating, and automated coulometric titration, carbon dioxide is developed from the sample. Coulometric titration demonstrated increased efficiency and accuracy that was on par with gravimetric and gasometric methods. The measurement of alkalinity direct potentiometric titration can be used to calculate the total CO_2 concentration of a sea water sample at end. The fundamentals of a technique, initially put forth by Dyrssen, are addressed, and a development of it is presented. This technique enables measurements of Ar and CO_2 to be made at sea with accuracy of 0.17% and 0.68%, respectively, at the 95% confidence limit. Bicarbonate and total volatile fatty acid concentrations in anaerobic digesters can be found by using a direct potentiometry alkalimetric approach that involves two-stage sequential titration. Bicarbonate and volatile fatty acid standard solutions were used to test the proposed technique over a pH range of 5.5 to 7.65. The amounts of total volatile fatty acids and bicarbonate in effluent samples from five laboratory anaerobic digesters processing various waste types were also determined using this method. By using the new technique, it was discovered that 96%of the volatile fatty acids and bicarbonate were recovered on average from standard solutions.

In the digester effluent samples, the total volatile fatty acid concentration determined using the new approach and those determined by a chromatographer were in good agreement.

Titration of the guest to solution of the host is the most typical method for quantifying interactions in supramolecular chemistry while observing changes in a physical property using Nuclear Magnetic Resonance (NMR), UV/visible spectroscopy (UV-Vis), fluorescence, or other methods. Despite the method's apparent simplicity, there are a number of concerns that need to be properly taken care of in order to guarantee the accuracy of the results. This includes the application of advanced data analysis techniques, such as global analysis, the use of non-linear rather than linear regression methods, the careful selection of a stoichiometric binding model, the choice of method (e.g., NMR *vs*. UV-Vis) and host concentration, and finally the estimation of uncertainties and confidence intervals for the results obtained.

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