

SOME PARTICULARS ABOUT TITRATIONS!

The purpose of the lab was to determine the concentration of ethanoic acid in vinegar. It is possible to determine the concentration of an acid or a base through titration. Titration is a technique that allows for a precise determination of concentration. An acid-base titration is a neutralization reaction, but the result is not necessarily a neutral solution (see explanation below).

A titration is used to determine the concentration (normality or molarity), not the acidity (K_a) or basicity (K_b).

Acidity is the concentration of hydronium ions in solution and basicity is the concentration of hydroxide ions in solution. The concentration is the number of moles of the compound in one litre of solution (molarity) OR the number of equivalents of H of the compound in one litre of solution (normality).

Normality is a measure of concentration in terms of equivalents per litre. An equivalent is the number of hydrogen ions or hydroxide ions that an acid or a base will lose during dissolution or neutralization.

The end of the neutralization process is marked by the equivalence point. This is the point at which the number of hydronium ions is equivalent to the number of hydroxide ions in solution; the mix of the solutions is proportional with respect to the chemical reaction that occurred. The equivalence point can be estimated with the use of an indicator. The colour change of an indicator marks the endpoint of the titration; this is the visual representation of the equivalence point, however not always exact (depends on the indicator and type of titration). The indicator is chosen according to where the equivalence point is estimated to be. The equivalence point is not necessarily neutral, pH 7.00, in all cases. The final pH of the solution depends on the salts that are formed during the neutralization process.

Standard solution: a solution with a known, precise concentration.

WARNING: DO NOT REFER TO THE EQUIVALENCE POINT AS THE NEUTRAL POINT. NEUTRAL IMPLIES pH 7.00 AND THIS IS NOT ALWAYS THE CASE!

A TITRATION CURVE DOES NOT FOLLOW THE RULE OF ANY PARTICULAR FUNCTION; IT IS A FAIRLY UNIQUE TYPE OF CURVE. IF YOU WERE TO DETERMINE THE pH AT ANY PARTICULAR POINT YOU WOULD NEED TO PERFORM A DIFFERENT TYPE OF CALCULATION AT THE POINT (BEFORE THE EQUIVALENCE POINT, AT THE EQUIVALENCE POINT, AND AFTER THE EQUIVALENCE POINT).

THE REASON FOR WHICH THE CURVE INCREASES GRADUALLY AT THE BEGINNING OF THE TITRATION IS DUE TO A BUFFERING EFFECT, WE REFER TO THIS AS THE BUFFER ZONE.