Answer on Question #74013, Chemistry / General Chemistry

Question:

A 1.00 g sample containing benzoic acid and gallic acid is titrated. Benzoic acid has MM=122 g/mol and has 1 acidic hydrogen. Gallic acid has MM=170 g/mol and has 1 acidic hydrogen. The acid mixture is dissolved and titrated with 0.500 M NaOH solution. To reach the endpoint in the titration a total volume of 14.7 mL of base was needed. What is the mass percent of benzoic and gallic acid?

Solution:

Amount of NaOH: $0.500 \cdot 0.0147 = 0.00735$ mol

Amount of the acidic hydrogen is the same: 0.00735 mol

"MM" of the "acid": $1.00 / 0.00735 = 136$ g/mol

Let "n" - <u>molar part</u> of the benzoic acid, then:

$122n + 170(1-n) = 136$

Solving the equation:

$122n + 170 - 170n = 136$

$48n = 34$

$n = 0.71$

Mass part of the benzoic acid: $0.71 \cdot (122/170) = 0.51$

Mass percent of the benzoic acid: 51%

Answer:

51% of the benzoic acid

49% of the gallic acid.