

Synthesis of potassium tris(oxalato)aluminate

Summary of the analysed protocols

$2\text{Al} + 6\text{KOH} + 6\text{H}_2\text{C}_2\text{O}_4 \rightarrow 2\text{K}_3[\text{Al}(\text{C}_2\text{O}_4)_3] \cdot 3\text{H}_2\text{O} + 3\text{H}_2$ (1)
$\text{Al}_2(\text{SO}_4)_3 + 6\text{NaOH} + 3\text{K}_2\text{C}_2\text{O}_4 + 3\text{H}_2\text{C}_2\text{O}_4 \rightarrow 2\text{K}_3[\text{Al}(\text{C}_2\text{O}_4)_3] \cdot 3\text{H}_2\text{O} + 3\text{Na}_2\text{SO}_4$ (2)
Protocol A¹
Reaction (R₁): equation (1), stoichiometric proportions of reagents, water and ethanol (auxiliary substances), T ~ 100 °C Isolation (I₁): cooling (ice bath) → filtration (suction) → washing (ethanol → ethyl ether) → drying (air) Purification: not prescribed
Protocol B^{2,3}
Reaction (R₂): equation (1), stoichiometric proportions of reagents, water and ethanol (auxiliary substances), T ~ 100 °C Isolation (I₂): cooling (ice bath) → filtration (suction) → washing (ethanol) → drying (air) Purification: not prescribed
Protocol C⁴
Reaction (R₃): equation (1), 14% exc. oxalic acid, 14% exc. potassium hydroxide, water and ethanol (auxiliary substances), T ~ 100 °C Isolation (I₃): cooling (ice bath) → filtration (suction) → washing (ethanol) → drying (suction) Purification: not prescribed
Protocol D⁵
Reaction (R₄): equação (1), 14% exc. oxalic acid, stoichiometric proportions of aluminium and potassium hydroxide, water and ethanol (auxiliary substances), T ~ 100 °C Isolation (I₄): cooling (ice bath) → filtration (suction) → washing (acetone) → drying (air) Purification: not prescribed
Protocol E⁶
Reaction (R₅): equation (1), stoichiometric proportions of reagents, water and ethanol (auxiliary substances), T ~ 100 °C Isolation (I₅): cooling (running water) → filtration → washing (ethanol:water → ethanol) → drying (air) Purification: not prescribed
Protocol F⁷
Reaction (R₆): equation (1), stoichiometric proportions of reagents, water and ethanol (auxiliary substances), T ~ 100 °C Isolation (I₆): filtration (suction) → washing (ethanol) → drying (desiccator) Purification: not prescribed
Protocol G⁸
Reaction (R₆): ≡ Pr F (scale enlarged to double) Isolation (I₆): ≡ Pr F Purification: not prescribed
Protocol H⁹
Reaction (R₇): equation (2), stoichiometric proportions of reagents, water (solvent), T ~ 100 °C Isolation (I₇): filtration → evaporation of the solvent → drying (air) Purification: not prescribed
Protocol I¹⁰
Reaction (R₈): equation (2), stoichiometric proportions of reagents, water (solvent), T ~ 100 °C Isolation (I₈): filtration → evaporation of the solvent Purification: not prescribed

^a → – Sequential

References

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