Synthesis of Alum Errors Checklist

In the Data, you did not:

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| --- | --- |
|  | Write units (g) by all masses and/or record all masses to the nearest 0.01g |
|  | Calculate theoretical yield correctly |
|  | Calculate percent yield correctly |
|  | use the right MM of KAl(SO­4)­3•12H2O (474.3 g/mol) |

In the Thought Questions, you did not:

|  |  |
| --- | --- |
|  | Conclude that the final fate of discarded aluminum foil would be Al2O3 and the left-over unreactive carbon that was present as a minor contaminant |
|  | Conclude that Al can be recycled easily since it is used in its elemental form, as opposed to fossil fuels, which are burned. |
|  | Conclude that the washing solution contains ethanol to reduce the solubility of alum in the washing solution, thus reducing the possible loss of product through redissolution |
|  | Calculate volume of H2 gas correctly |

In the Supplement, you did not:

|  |  |
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|  | Conclude that the unit cell is cubic because only one dimension and no angles are specified. The minimum amount of information is provided in reporting unit cell parameters for brevity. If only one dimension is stated, then one can assume that all sides (dimensions) are the same length. Also, if angles are not specified, then one can assume that all angles are 90˚. |
|  | Conclude that K+ are in all of the octahedral holes defined by a FCC lattice |
|  | Conclude that Al3+ are in the FCC lattice positions (8 corners + 6 faces) |
|  | Conclude that SO42- are in all of the possible tetrahedral holes |
|  | Complete unit cell contents calculation correctly:  Al3+: 8(1/8) + 6(1/2) = 4 Al3+  KAl(SO4)2  K+: 12(1/4) + 1(1) = 4 K+  SO42-: 8(1) = 8 SO42- |
|  | Compare side length if Al3+ and K+ touch (2\*radius of Al3+ + 2\*radius of K+) to the given cell length of 12.135 Å |
|  | Use the correct ionic radii for this situation (octahedral coordination for K+ and Al3+) |
|  | note hydration of Al3+ as Al(H2O)63+, thus increasing its radius |