

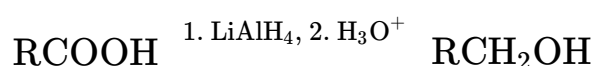
Carboxylic Acid Reactions: Identifying Incorrect Statement

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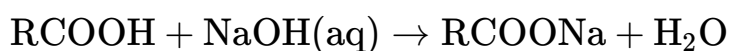
Response: The **incorrect** statement is **(2)**.

Analysis of Options:

- **(1) Correct:** Lithium aluminium hydride (LiAlH_4) reduces carboxylic acids to alkoxides/aluminium complexes, which yield primary alcohols upon acidic hydrolysis:



- **(2) Incorrect:** Carboxylic acids react with aqueous sodium hydroxide (NaOH) in a simple acid-base neutralization reaction to form a carboxylate salt and water. **No carbon dioxide (CO_2) gas is liberated.**

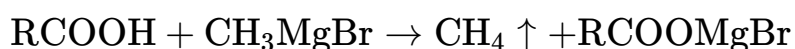


(Note: CO_2 gas is liberated when reacting carboxylic acids with sodium carbonate (Na_2CO_3) or sodium bicarbonate (NaHCO_3), not NaOH .)

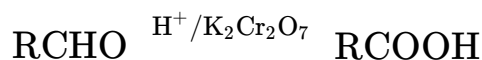
- **(3) Correct:** Carboxylic acids react with phosphorus pentachloride (PCl_5) to replace the hydroxyl group ($-\text{OH}$) with a chlorine atom ($-\text{Cl}$), yielding acyl/acid chlorides:



- **(4) Correct:** Grignard reagents like methylmagnesium bromide (CH_3MgBr) contain a strongly basic carbanion (CH_3^-). They react immediately with the acidic proton of a carboxylic acid to form methane gas (CH_4):



- **(5) Correct:** Acidified potassium dichromate ($\text{H}^+/\text{K}_2\text{Cr}_2\text{O}_7$) is a strong oxidizing agent that oxidizes aldehydes to carboxylic acids:



Correct Answer:

(2) Carbon dioxide is liberated when carboxylic acids are reacted with aqueous NaOH .
