Carboxylates

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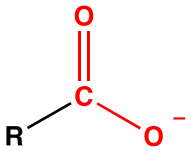
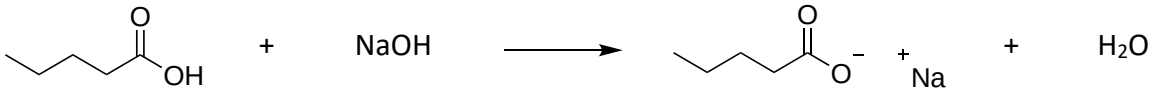
Summary

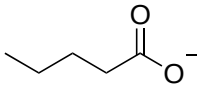
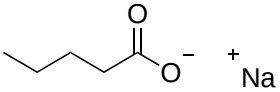
Functional group	General formula	Structure/example	Prefix	Suffix
Carboxylate	-COO^-		carboxy-	-oate

Carboxylates are formed when a carboxylic acid is reacted with a base.



pentanoic acid + sodium hydroxide ⟶ sodium pentanoate + water

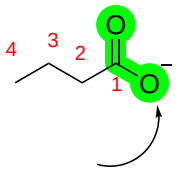
They may be represented in the form of an ion or a salt.

Carboxylate ion	Carboxylate salt
	
pentanoate	sodium pentanoate

Carboxylate ions are named by:

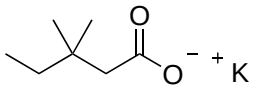
1. Identify the parent carboxylic acid
2. Replace '-oic acid' with '-oate'
3. If present, the name of the positive ion goes first

For example:

Step	Example
1	 parent carboyxlic acid is butanoic acid
2	butanoic acid becomes butanoate

Worked Examples

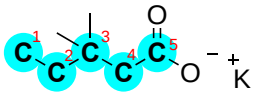
potassium 3,3-dimethylpentanoate



STEP 1: Identify the parent hydrocarbon chain

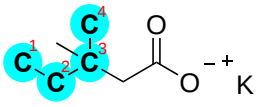
1.1 It should have the functional group with the highest priority
1.2 It should have the maximum length

Option 1



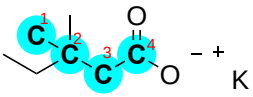
- Functional group ✓
- Longest chain ✓

Option 2



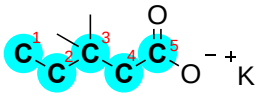
- Functional group ✗
- Longest chain ✗

Option 3



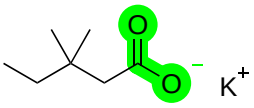
- Functional group ✓
- Longest chain ✗

STEP 2: Count the number of carbons in the parent hydrocarbon chain and identify the appropriate prefix. If the parent chain is an alkane, add the -an suffix



5 C = PENT
ALKANE = -AN

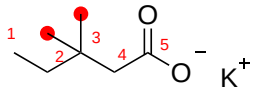
STEP 3: Identify the functional group with the highest priority and its suffix



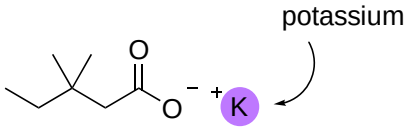
CARBOXYLATE = -OATE

STEP 4: Identify side chains. Count the number of carbons and identify their prefix and suffixes

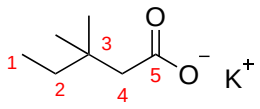
1 C = METHYL-
2x METHYL = DIMETHYL-



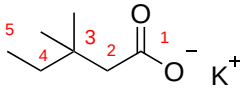
STEP 5: Identify any remaining functional groups (including double and triple bonds) and their suffixes



STEP 6: Number the parent hydrocarbon chain from the end that produces the lowest set of locants for, in order of precedence, functional groups, double and triple bonds and side chains



COO^- = 5
METHYL = 3,3



COO^- = 1
METHYL = 3,3

Lowest locants possible ✔

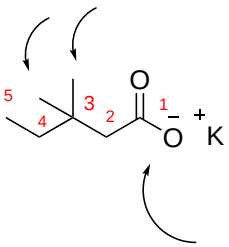
STEP 7: Numbers indicating the locant of the functional group are placed directly before the functional group portion of the name.

7.1 Names are listed alphabetically

7.2 If there is more than one of the same functional group, the prefix di- (2), tri- (3), tetra- (4) are used. These are not considered for alphabetical listing

7.3 If the functional group is in a position where no alternative position is possible, no number is required (e.g. ethan-1-ol should be written as ethanol)

3,3-DIMETHYL

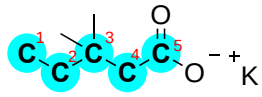


-OATE

COO^- always on terminal group
The 1 locant can be dropped

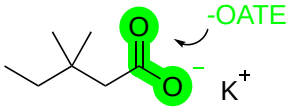
STEP 8: Write the complete name

8.1 Commas are written between numbers
8.2 Hyphens are written between numbers and letters
8.3 Successive words are combined into one word



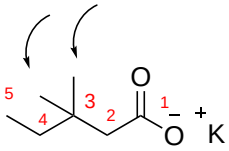
5 C = PENT
ALKANE = -AN

Steps 1,2

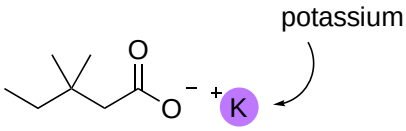


Step 3

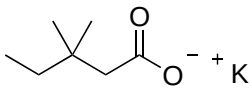
3,3-DIMETHYL



Steps 4,6,7



Step 5



potassium 3,3-dimethylpentanoate

Step 8