

33 Relative acidities – Part 2

Name: _____ Class: _____ Date: _____

Vocabulary

Write each word three times.

English

Write it 3 times (English)

acidity

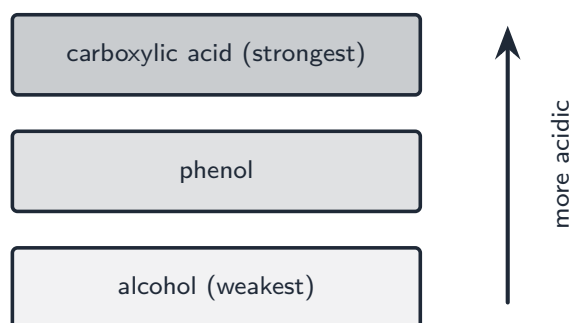
Recall

Alcohols, phenols and carboxylic acids differ in **acidity** . There is a clear order, and a reason.

New ideas

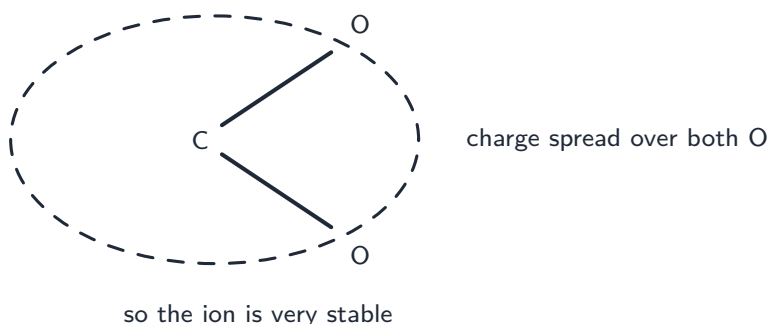
Read these first, then do the Practice.

■ 1 The acidity order



The order is: alcohol < phenol < carboxylic acid. The carboxylic acid is the strongest.

■ 2 Why a carboxylic acid is strongest



When it loses H^+ , the negative charge spreads over *two* oxygen atoms, making the ion very stable. In a phenol the charge spreads only into the ring; in an alcohol it is not spread at all.

Watch out: acidity rises alcohol < phenol < carboxylic acid because the anion's charge is spread *more*: not at all (alcohol) → into the ring (phenol) → over *two* oxygens (carboxylate). A more spread-out (stable) anion means a stronger acid.

Practice

Try these in order.

33.6 Put alcohol, phenol and carboxylic acid in order of *increasing* acidity. [1]

33.7 Which of the three is the strongest acid? [1]

33.8 Why is a carboxylic acid the strongest? [1]

33.9 Where does a phenol's negative charge spread? [1]

33.10 In an alcohol, how much is the charge spread? [1]

33.11 Challenge. Explain why a carboxylic acid is a stronger acid than phenol, in terms of the stability of the ion each forms when it loses H^+ . [2]
