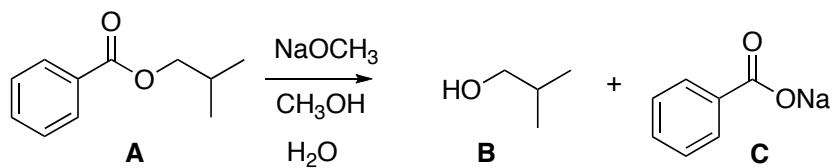


Ultraviolet Practice #3

Heating ester **A** in methanol containing sodium methoxide and a trace of water converts it to alcohol **B** and sodium benzoate **C**. A 1.0 gram sample of **A** in 50 mL of methanol and excess sodium methoxide shows an absorbance of 0.773 at 293 nm. After adding a little water and heating, the absorbance is 0.600. The molar absorptivity of **C** at 293 nm is 3.4. How many milligrams of water have been consumed?



$$1.0 \text{ g} / 50 \text{ mL} = 20 \text{ g/L} = 0.112 \text{ M}$$

$$\epsilon = \frac{A}{[\text{C}]} = 6.9$$

$$[\text{A}] + [\text{C}] = 0.112$$

$$6.9 [\text{A}] + 3.4 [\text{C}] = 0.600$$

$$[\text{C}] = 0.049$$

it follows that 0.049/ 20 moles of water have been consumed

this is 0.0025 moles of water, or 45 milligrams