Question #78733

Sodium rhodizonate is often used in forensic investigations to detect the presence of any residue from shooting a firearm. Burned and unburned particles from the gunpowder will be ejected with the projectile. In the photograph below, the residue from the gunshot is stained red by sodium rhodizonate at a pH of 2.8. How many mL of 0.65 M hydrochloric acid need to be added to a neutral solution of sodium rhodizinate to make 500.0 mL of solution with a pH of 2.800?

Answer:

The precise formula for calculating the pH and pOH is

$$pH = - \log[H^+]$$

$$pOH = - \log[OH^-]$$

$$[H^+] = 10^{-pH}$$

$$[OH^-] = 10^{-pOH}$$

Therefore:

$[H^+] = 10^{-pH}$
$[H^+] = 10^{-2.8} = 0.001584$

And
V=500 ml = 0.5 l
C_M=n/V n=C_M x V n=0.001584 x 0.5=0.0008 moll
V=n/C_M = 0.0008/0.65=0.00123 l
V=0.00123 l = 1.23 ml.