

Electronic Supplementary Information: Microaxicave colour analysis system for fluoride concentration using smartphone

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The preparation steps of the fluoride chromogenic agent

Step 1: fluoride reagent solution: Using 5 ml deionized (DI) water to infiltrate 193 mg alizarin complexone dihydrate. Dissolving the mixture with sodium hydroxide and adding 125 mg sodium acetate trihydrate. Adjusting the pH value with hydrochloric acid to 5.0 and diluting to 500 ml with DI water.

Step 2: buffer solution: Dissolving 35 g sodium acetate into 800 ml DI water. Adding 75ml glacial acetic acid and diluted to 1000 ml with DI water. Adjusting the pH value to 4.1 with acetic acid or sodium hydroxide.

Step 3: lanthanum nitrate solution: Dissolving 443mg lanthanum nitrate hexahydrate with little hydrochloric acid. Adjusting the pH value to 4.1 with 1 mol/L sodium acetate solution and diluting to 1 L with DI water.

Step 4: fluoride chromogenic agent: When we need to measure the concentration of fluoride in aqueous solution. We mix the fluoride reagent solution carried out in step 1, buffer solution made in step 2, lanthanum nitrate solution made in step 3 and acetone with volume ration 3:1:3:3 we can have the fluoride chromogenic agent.

The preparation steps of the standard fluoride solution

Step 1: fluoride standard stock solution: Dissolving 0.2210 g 105 °C stove for 2 hours sodium fluoride with DI water. Diluting the solution to 1000 ml in a 1000 ml volumetric flask and storing in a polyethylene bottle. The fluoride concentration of this solution is 100 µg/mL

Step 2: standard fluoride solution: Diluting 20 ml fluoride standard stock solution produced in step 1 to 1000 ml in 1000 ml a volumetric flask and storing in a polyethylene bottle. The fluoride concentration of this solution is 2 µg/ml.