Nishant Jindal

Brown Ring test

NO_2^- + dil H_2SO_4 + $FeSO_4$ (Freshly Prep.) ⟶ Brown Ring Complex

NO_2^- + dil H_2SO_4 ⟶ HNO_2 + HSO_4^-

HNO_2 ⟶ $NO + HNO_3$

$FeSO_4$ (Freshly Prep.) + $NO + 5H_2O$ ⟶ $[Fe(H_2O)_5NO]SO_4$

$FeSO_4 \cdot NO$

Colour due to charge transfer

Brown Ring Complex

sp^3d^2, outer ; high spin

Para. $\mu = 3.87$

$Fe = +1$, NO = five

Ques 10 Why Freshly Prep. $FeSO_4$ use?

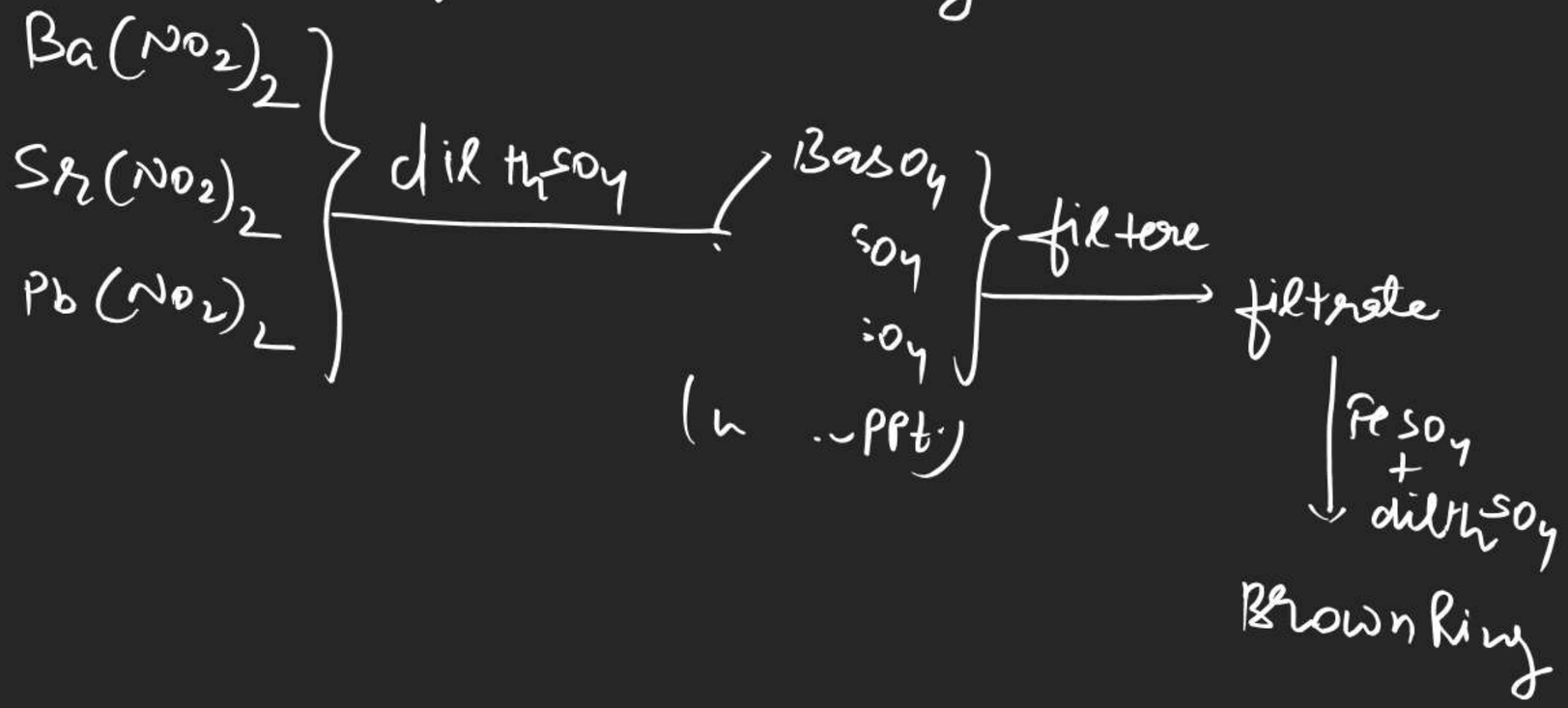
Ans ⇒ $FeSO_4$ is good absorber of NO

$FeSO_4$

Ques Why dil H_2SO_4 added by the side wall of the test tube?

Nishant Jindal

if Brown ring test perform by mixture



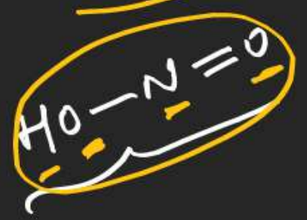
Test with KI

$$NO_2^- + I^{\ominus} \longrightarrow NO + I_2$$

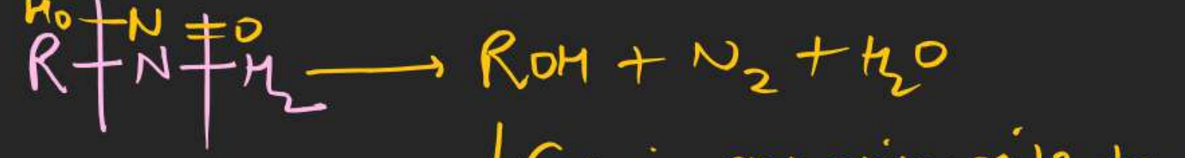
Test based on HNO_2

① Test with Urea -

HNO_2



② Test with $R-NH_2$ →



Cerric ammonium nitrate

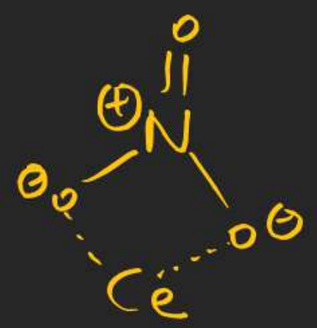
$(NH_4)_2[Ce(NO_3)_6]$

Red col.

Nishant Jindal

Ans C.N of Ce in Ceric ammonium nitrate

$(NH_4)_2[Ce(NO_3)_6]$



Ce^{+4} C.N = 12

Test with NH_4Cl and $NaNO_2$

$$NH_4Cl + NaNO_2 \xrightarrow{\Delta} N_2 + NaCl + H_2O$$

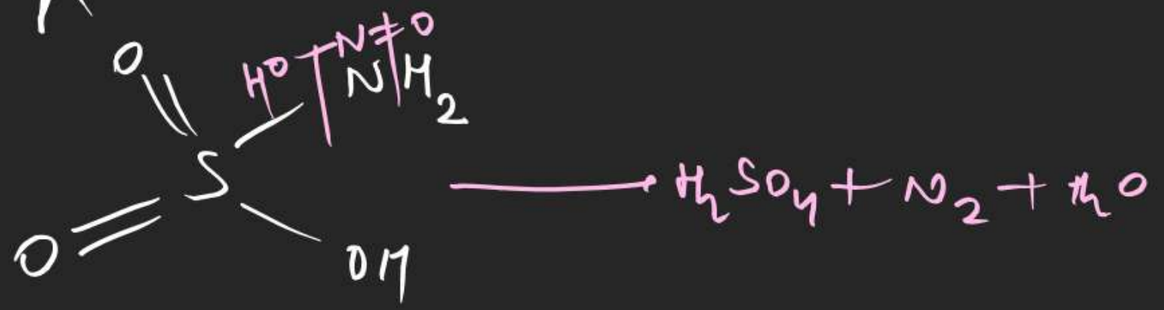
Test with Thio urea

$$H_2N-CS-NH_2 + HNO_2 \xrightarrow{\Delta} \bar{S}CN + N_2$$

$\bar{S}CN \xrightarrow{Fe^{+3}}$ Blood Red Col.

Thio cyanate and Iodate must absent

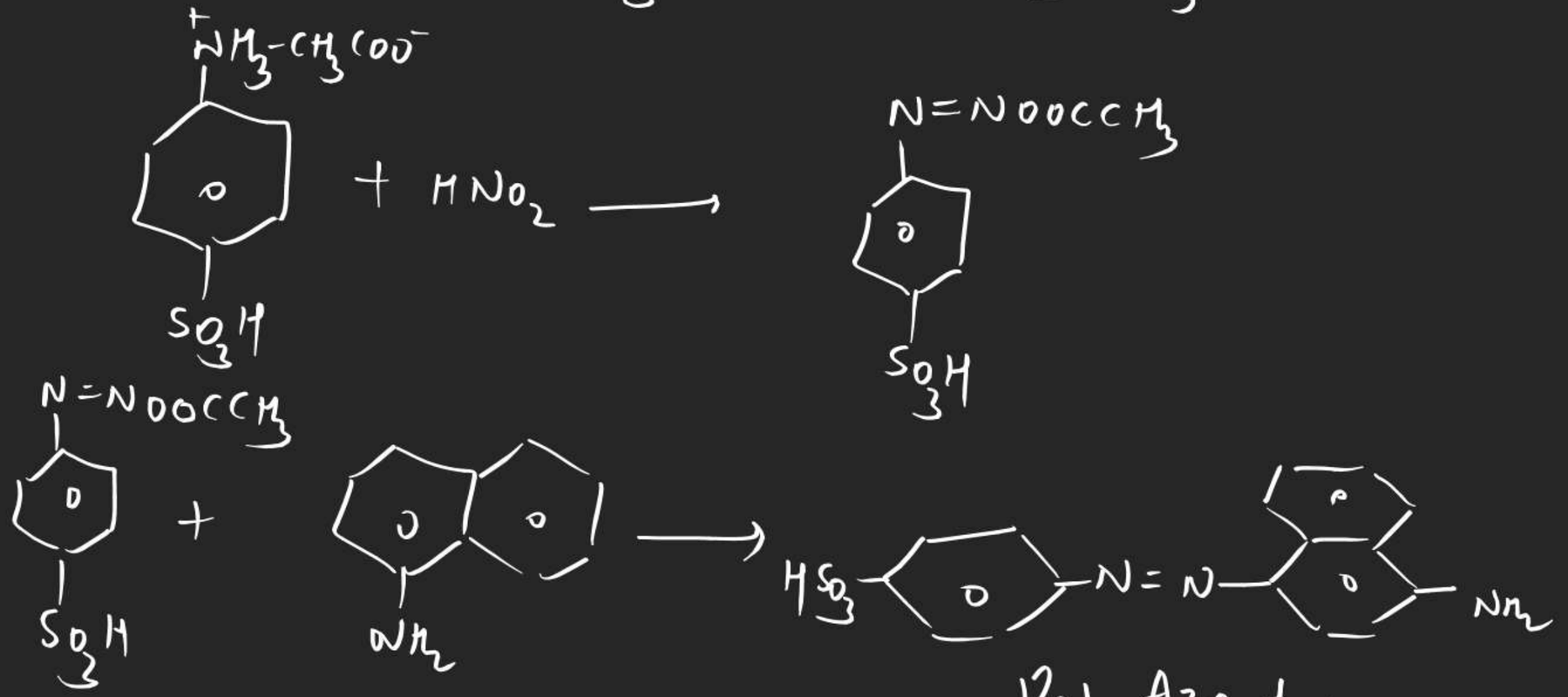
★ Test with Sulphamic acid



Note ⇒ In other reactions traces of NO_3^- also formed except Sulphamic

Griess-Ilosay test

$NO_2^- + CH_3COOH \longrightarrow HNO_2 + CH_3COO^-$



Red Azo dye

Class-A

Sub group - II

① NO_3^- = all are soluble

② Test with acid

$$NO_3^- + Conc.\ H_2SO_4 \longrightarrow HNO_3$$

$$HNO_3 \xrightarrow{\Delta} NO_2\uparrow + H_2O + (O)$$

(brown fumes)

OR Cu turnings

$$Cu + HNO_3 \longrightarrow Cu(NO_3)_2 + NO$$

$$NO + \frac{1}{2}O_2 \longrightarrow NO_2\uparrow$$

Nishant Jindal

Brown Ring test

$$NO_3^- + Conc.H_2SO_4 \longrightarrow HNO_3 + HSO_4^-$$

$$FeSO_4 + HNO_3 \longrightarrow Fe_2(SO_4)_3 + NO$$

$$FeSO_4 + NO + 5H_2O \longrightarrow \underset{\text{Brown Ring complex}}{\left[Fe(H_2O)_5(NO)\right]SO_4}$$

($FeSO_4$ remaining)

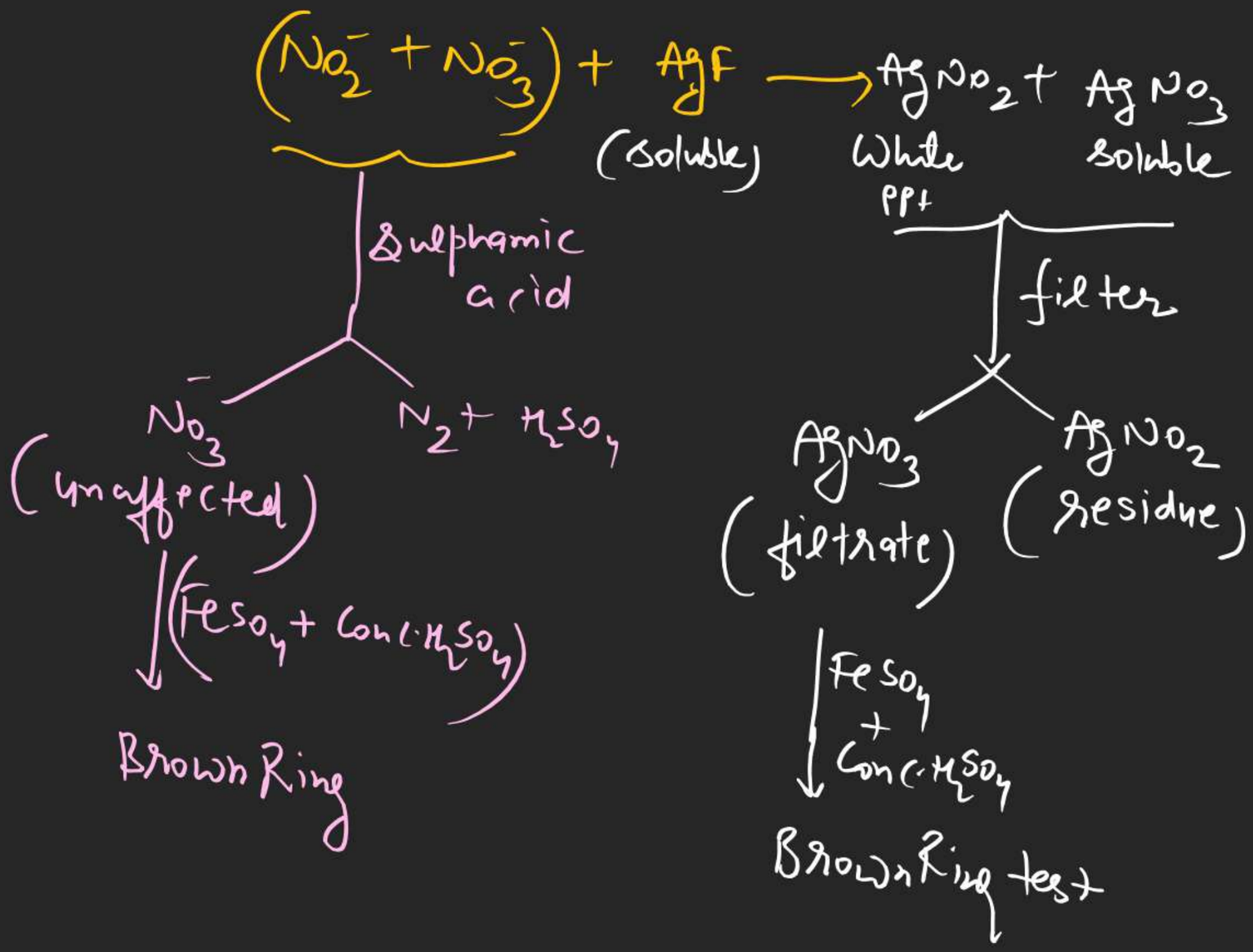
Que Can we perform brown Rings for NO_2^- in presence of NO_3^-

Yes by using dil H_2SO_4

Que Can we perform brown Ring test for NO_3^- in presence of NO_2^-

Not, because in presence of conc. H_2SO_4 both can perform.

Nishant Jindal



$F^{\ominus}$ = all are Insoluble except BeF_2 and AgF ⇒

Test with acid [etching test]

$F^{\ominus}$ + Conc H_2SO_4 ⟶ H_2F_2 (Monomer HF does not exist due to H-Bonding) —react with SiO_2 present in glass→ SiF_4 —Hydrolysed with glass rod→ H_4SiO_4 white fumes

Note ⇒ HF can not kept in glass because it can corrode so it is kept in wax coated glass vessales

Test with $CaCl_2$ / $MgCl_2$

$$F^{\ominus} + CaCl_2 / MgCl_2 \longrightarrow CaF_2 / MgF_2$$

White ppt.

Test with $FeCl_3$

$$Fe^{+3} + NaF \longrightarrow Na_3[FeF_6]$$

White crystalline