

What Makes Particles Stick to a Surface and How Do They Come Off

Egon Matijević

Clarkson University, Potsdam, NY

INTERACTIONS IN MIXED DISPERSIONS

- PARTICLE – PARTICLE
HETEROCOAGULATION
- PARTICLE – PLANE SURFACE
ADHESION
- PARTICLE – BUBBLE
MICROFLOTATION

PARAMETERS

- HETEROCOAGULATION

PARTICLES OF COMPARABLE SIZE

- ADHESION

PARTICLES OF WIDELY DIFFERENT SIZE

r_1 and r_2

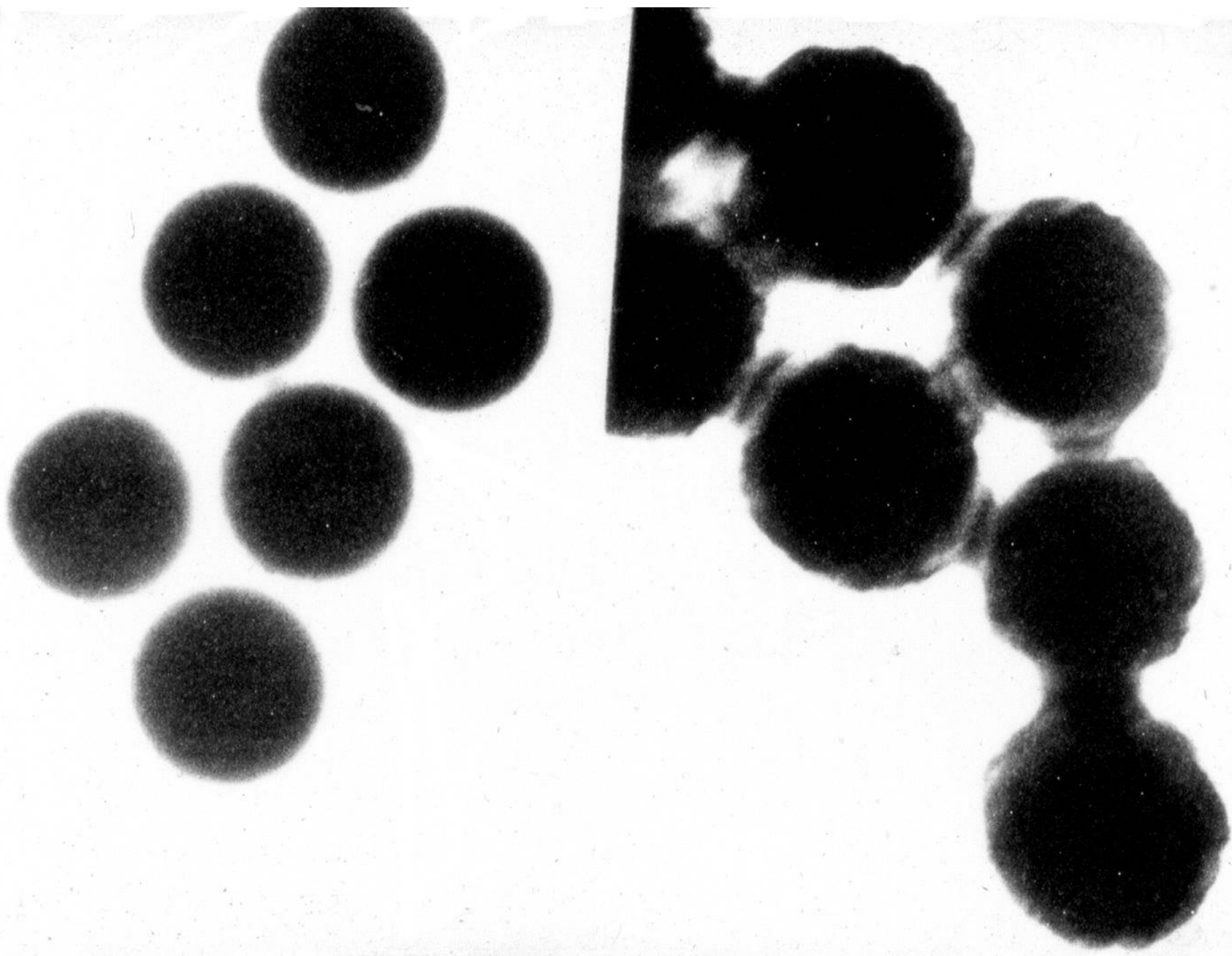
n_1 and n_2

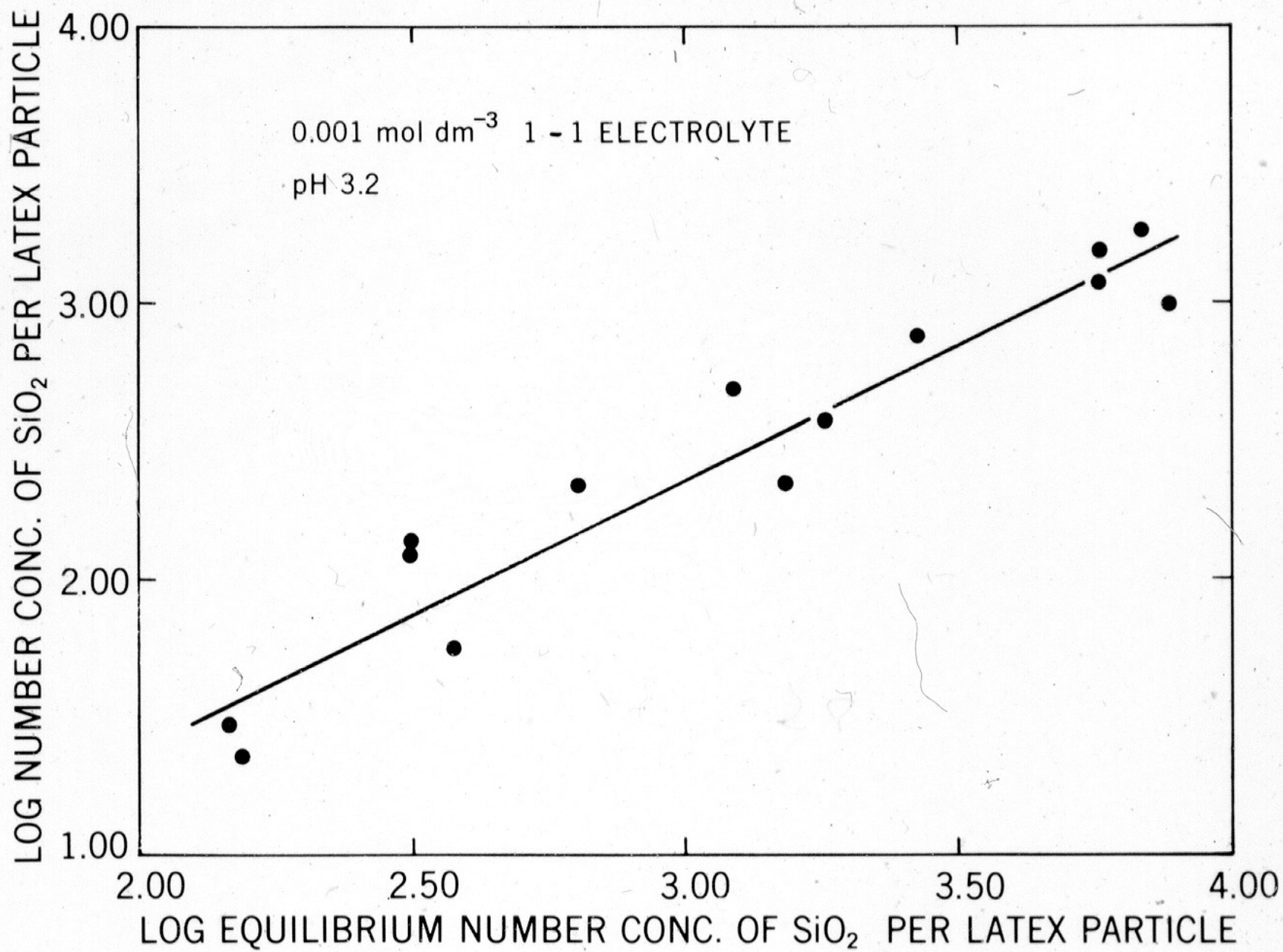
ψ_1 and ψ_2

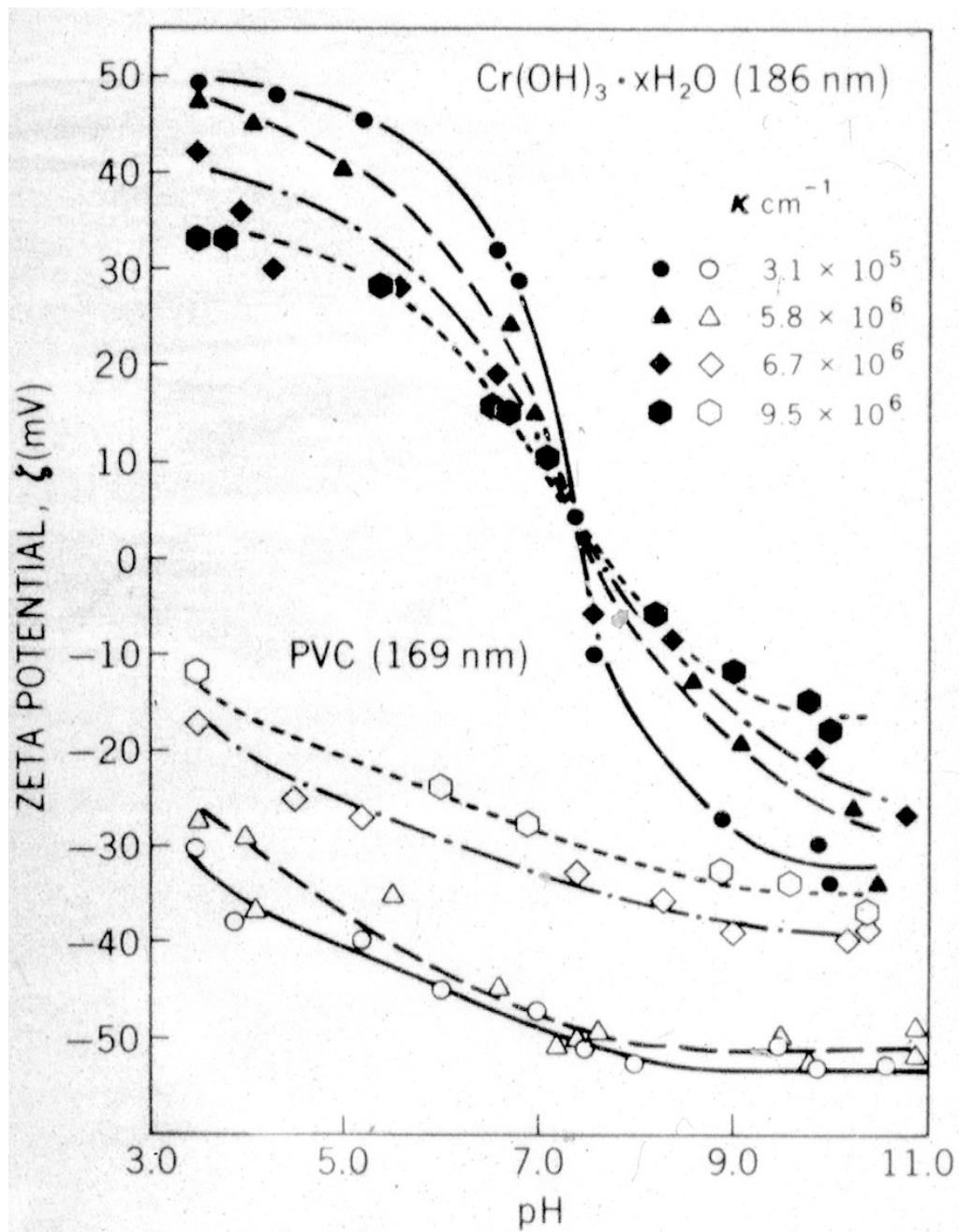
A_1 and A_2

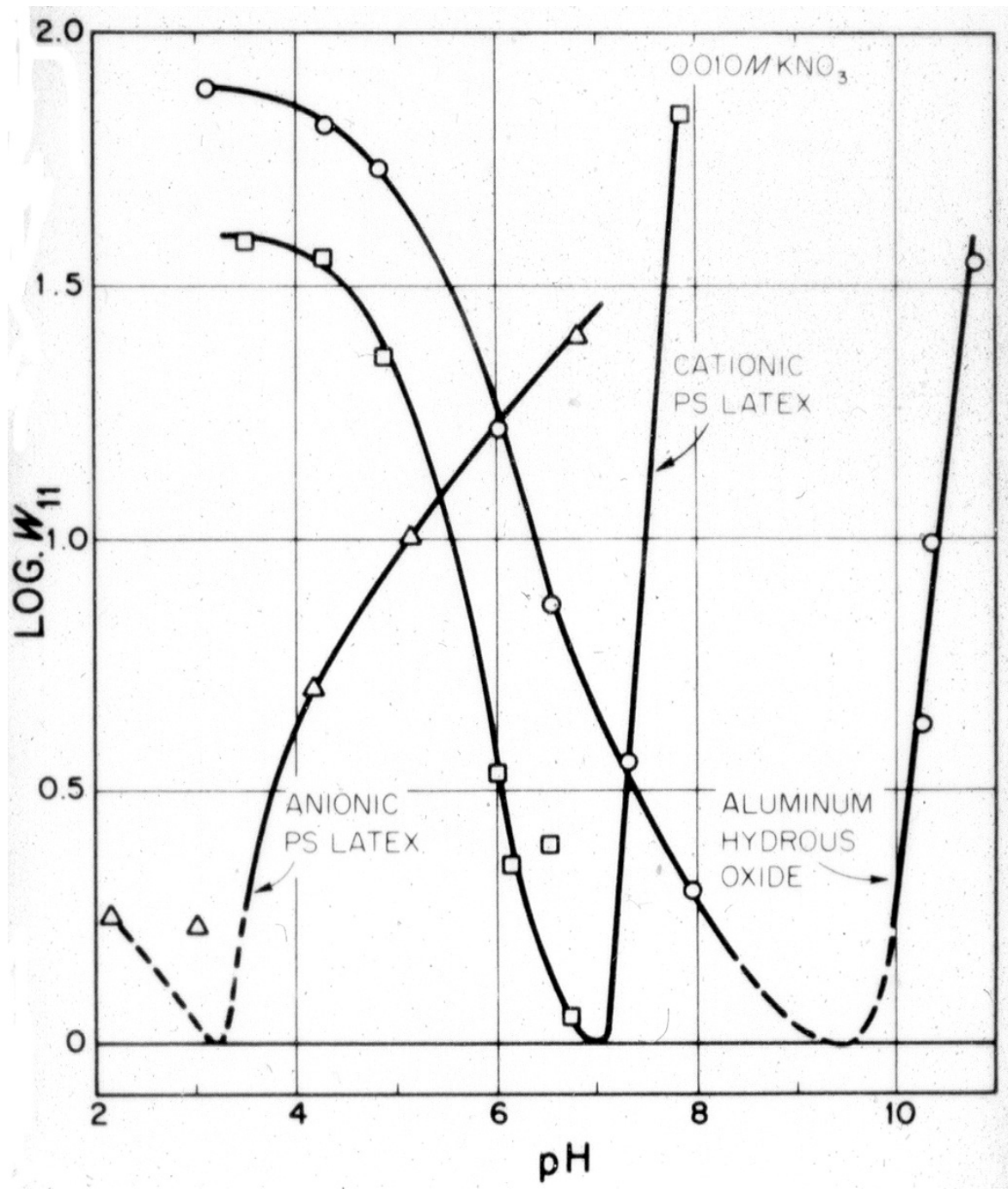
μ

HETEROOCOAGULATION









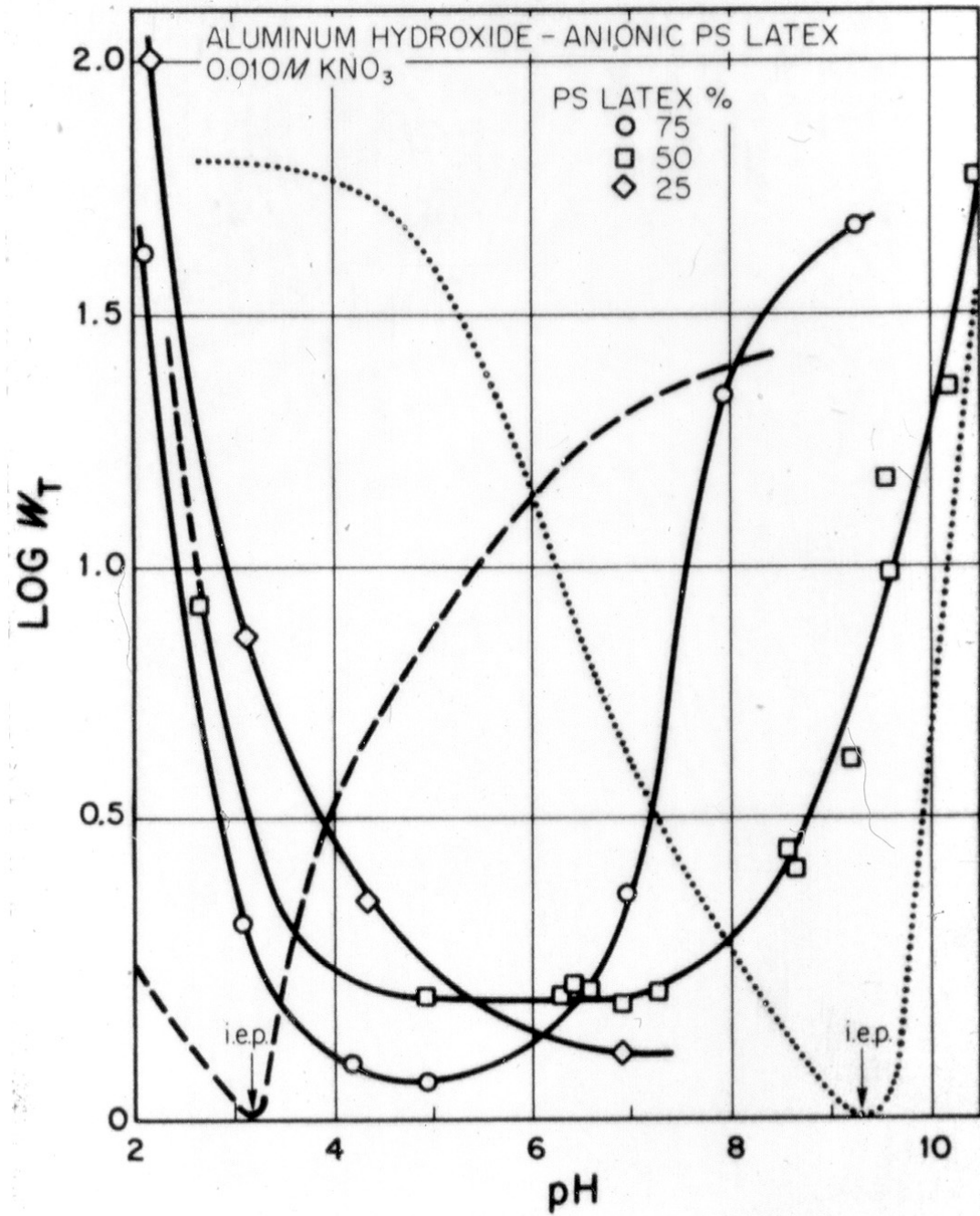


TABLE V

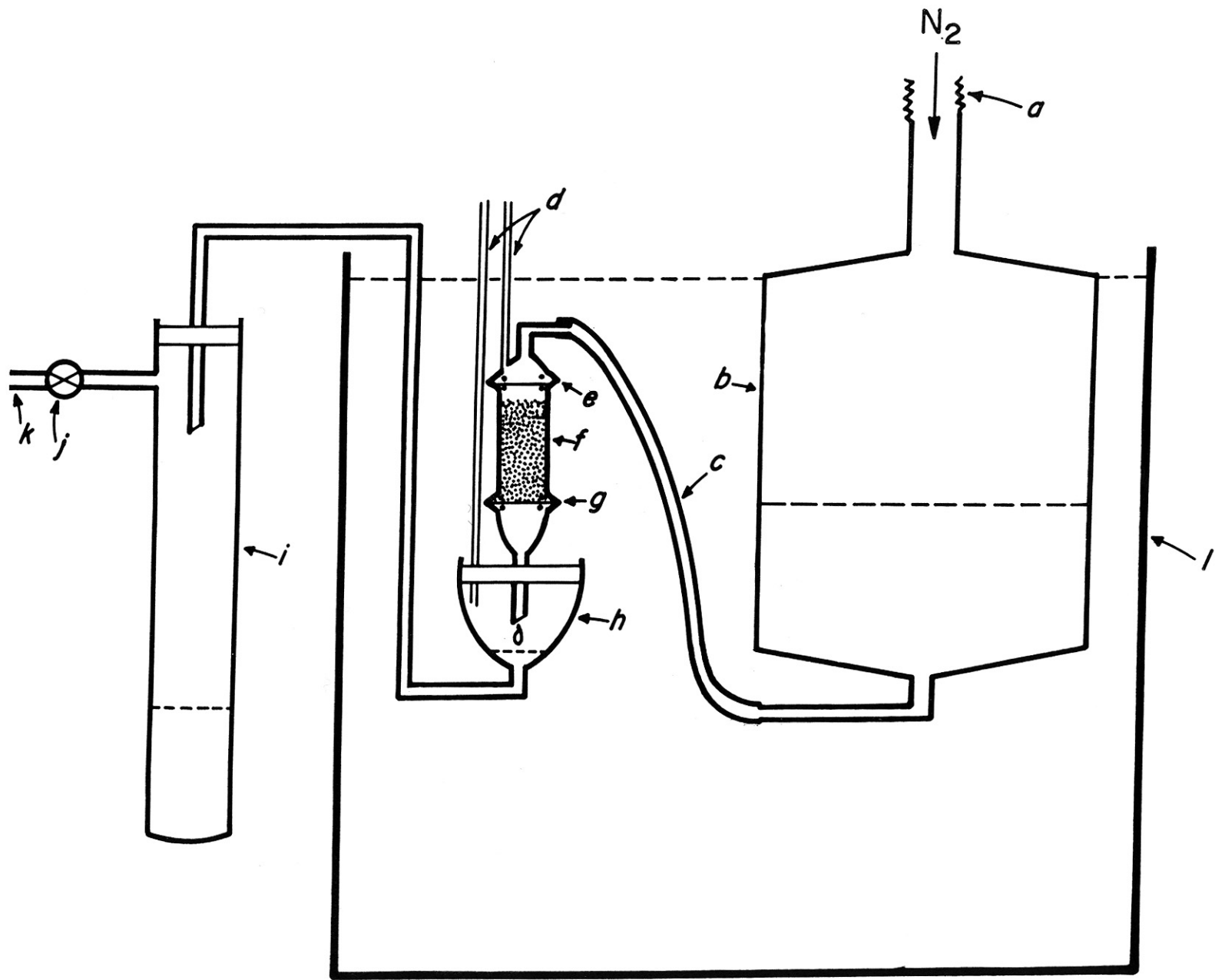
THEORETICAL AND EXPERIMENTAL (IN PARENTHESES)
 VALUES OF $\log W_T$ AT THREE CONCENTRATIONS OF
 $\text{NaNO}_3(c_e)$

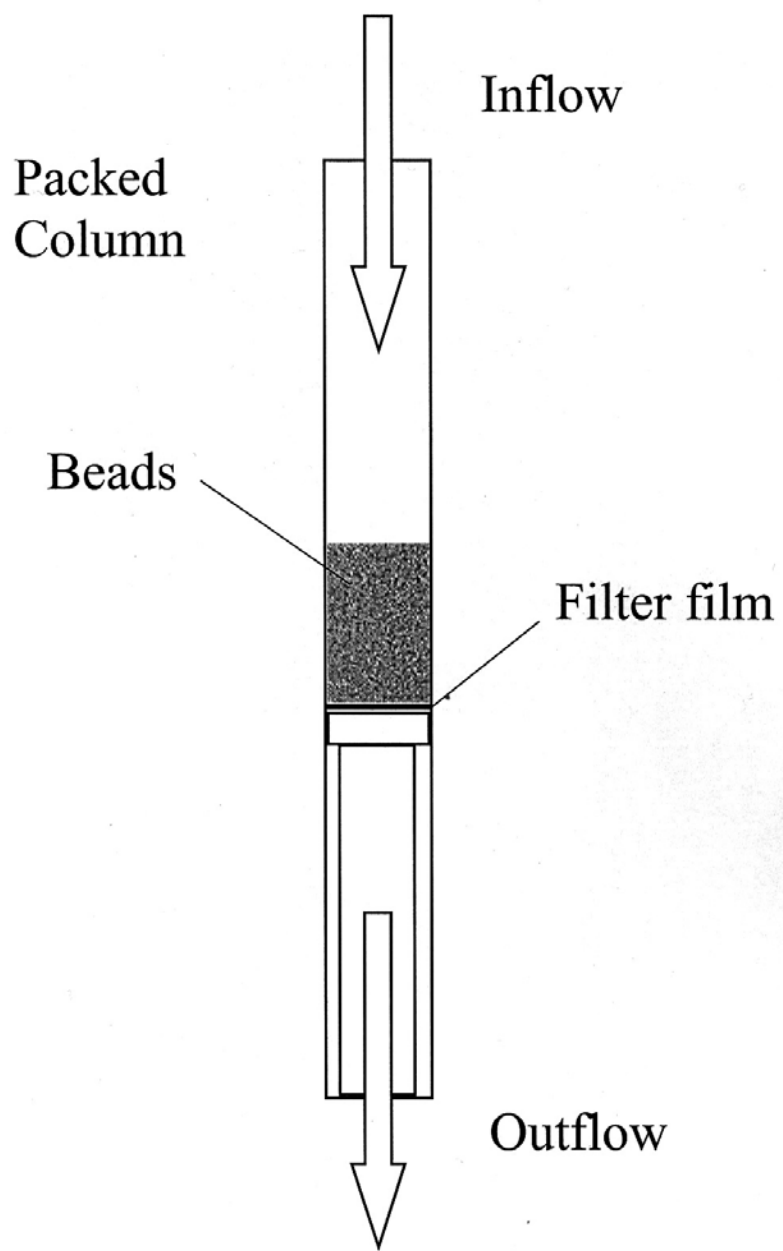
| <u>c_e (M)</u> | <u>$\log W_T$ at pH 8.0</u> | <u>$\log W_T$ at pH 9.0</u> |
|-----------------------------|--|--|
| 0.016 | 5.75 (0.70) | 30.7 (1.60) |
| 0.032 | 4.60 (0.38) | 28.6 (1.00) |
| 0.063 | 3.32 (0.27) | 26.2 (0.95) |

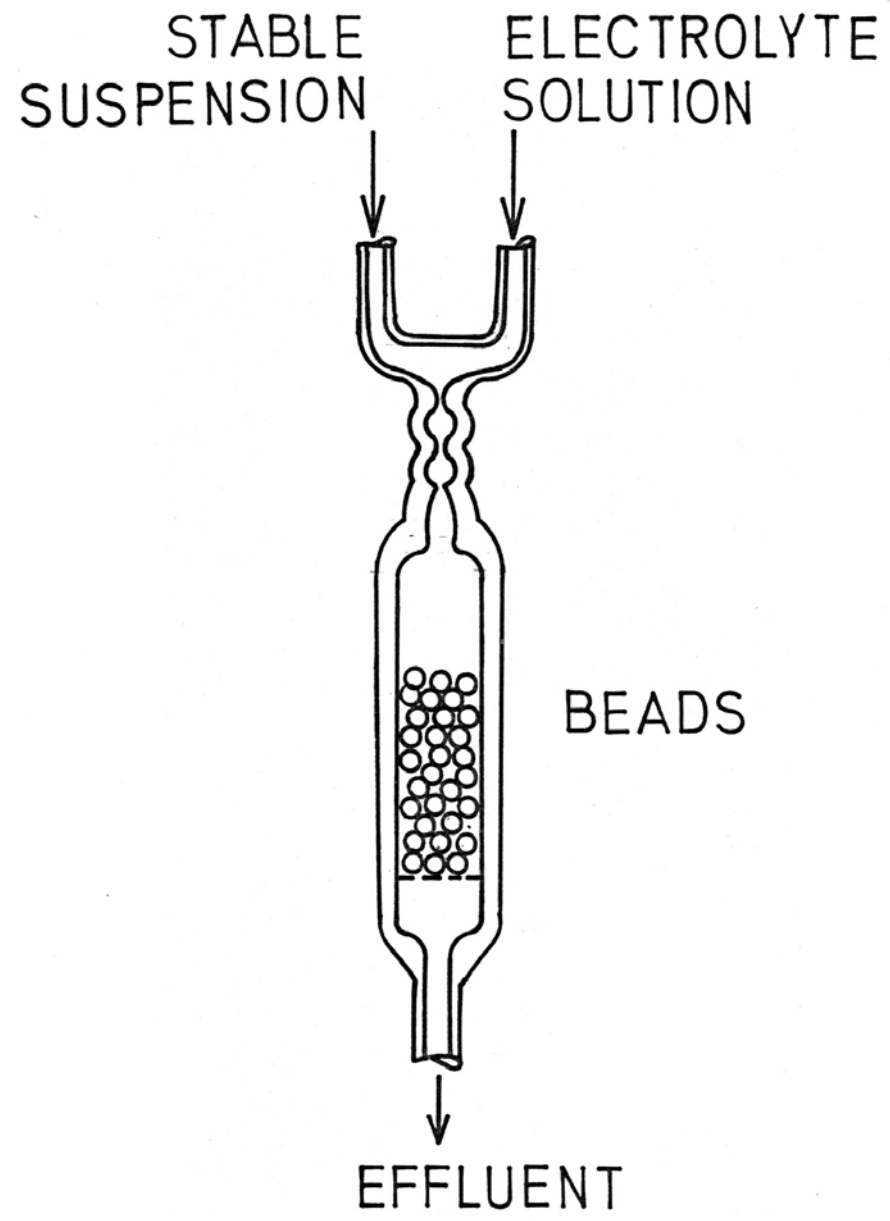
ADHESION

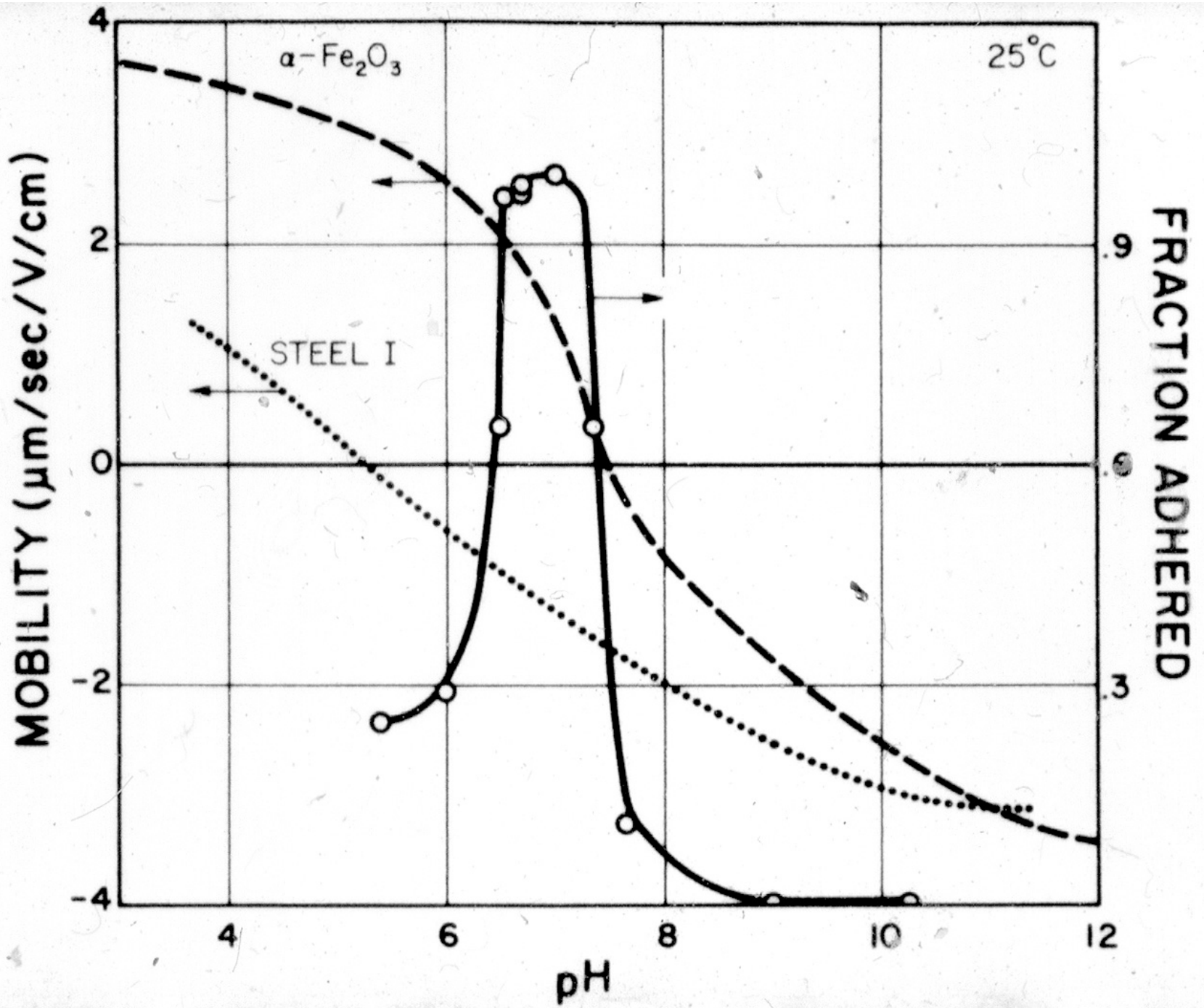
PARTICLE DEPOSITION

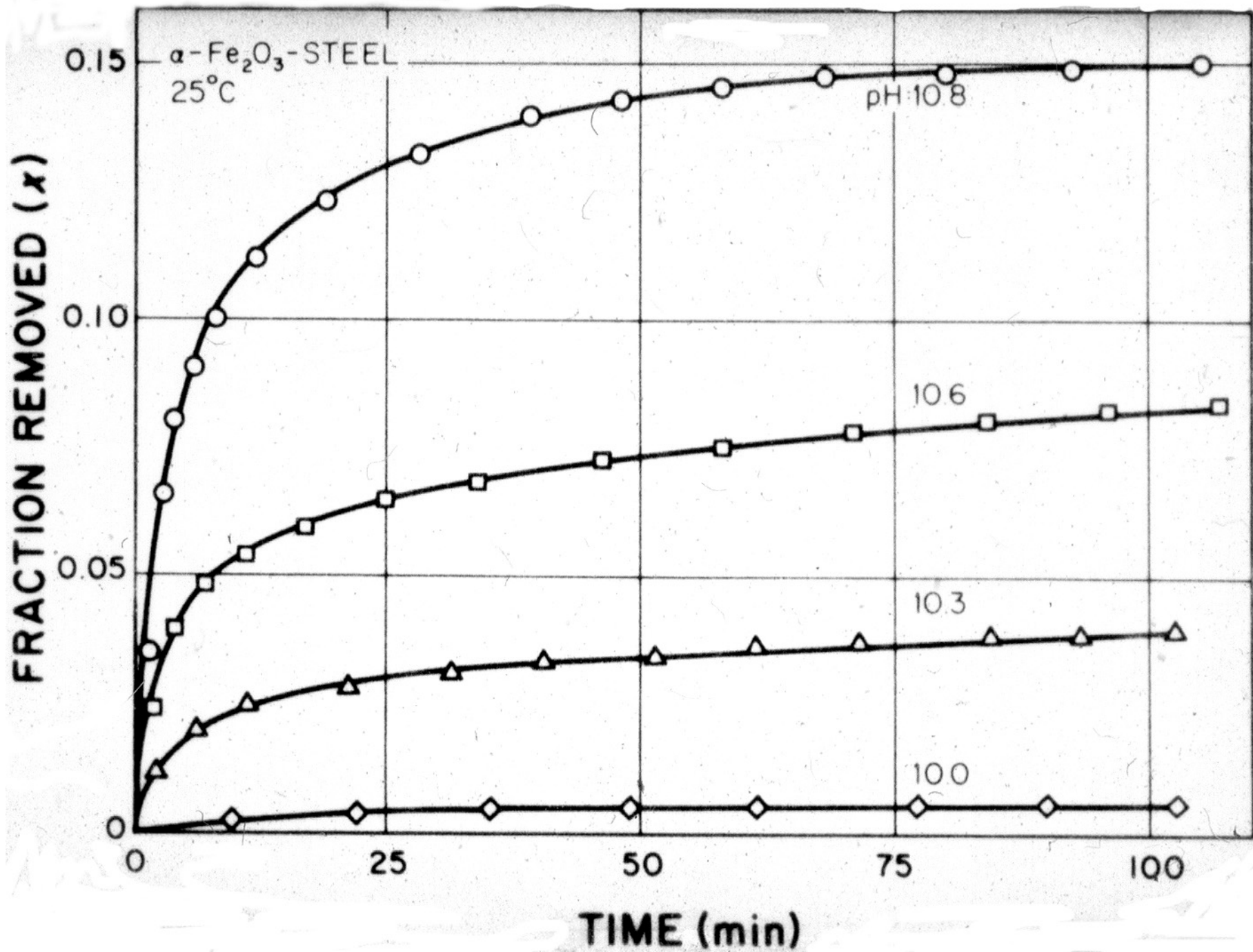
PARTICLE DETACHMENT

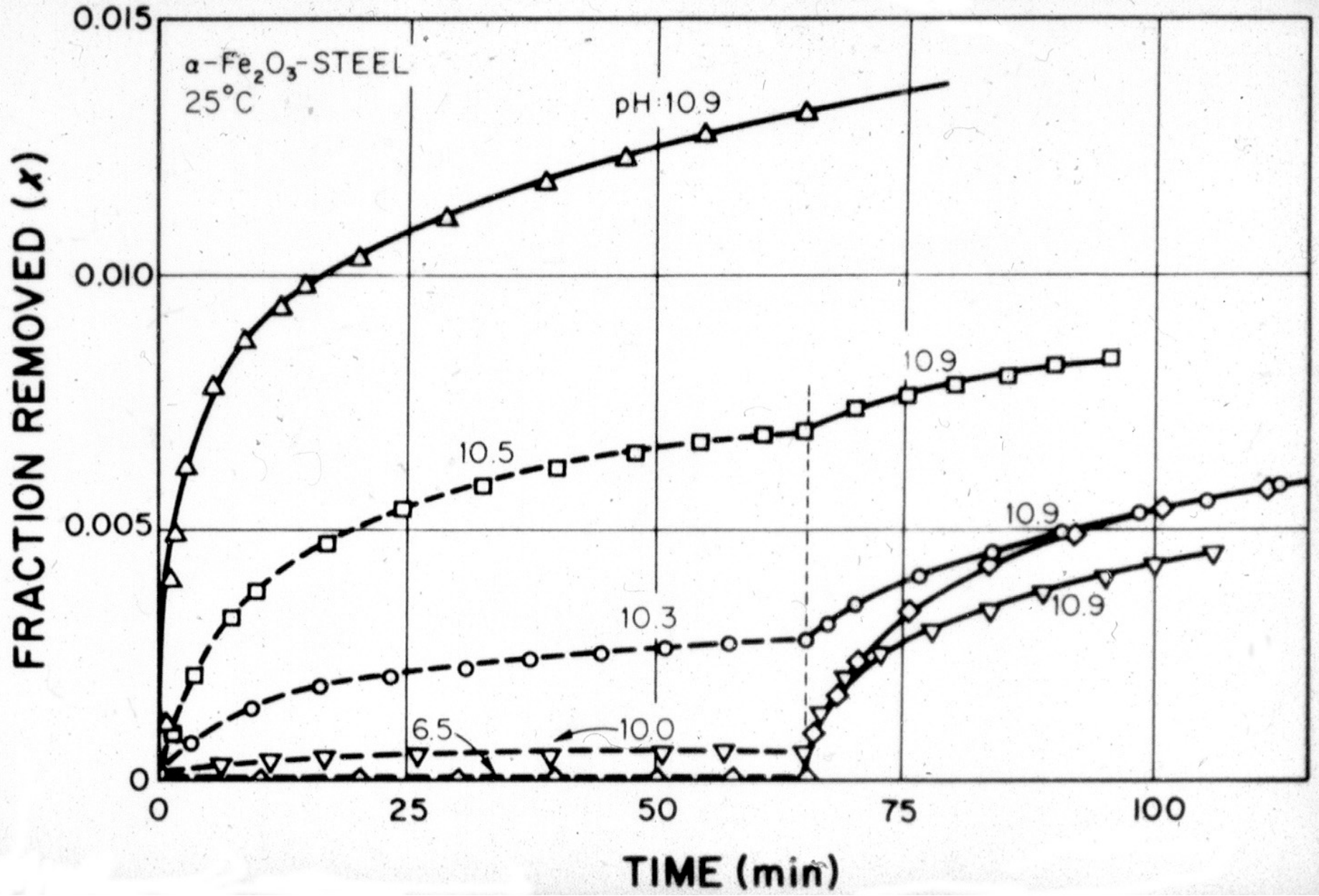


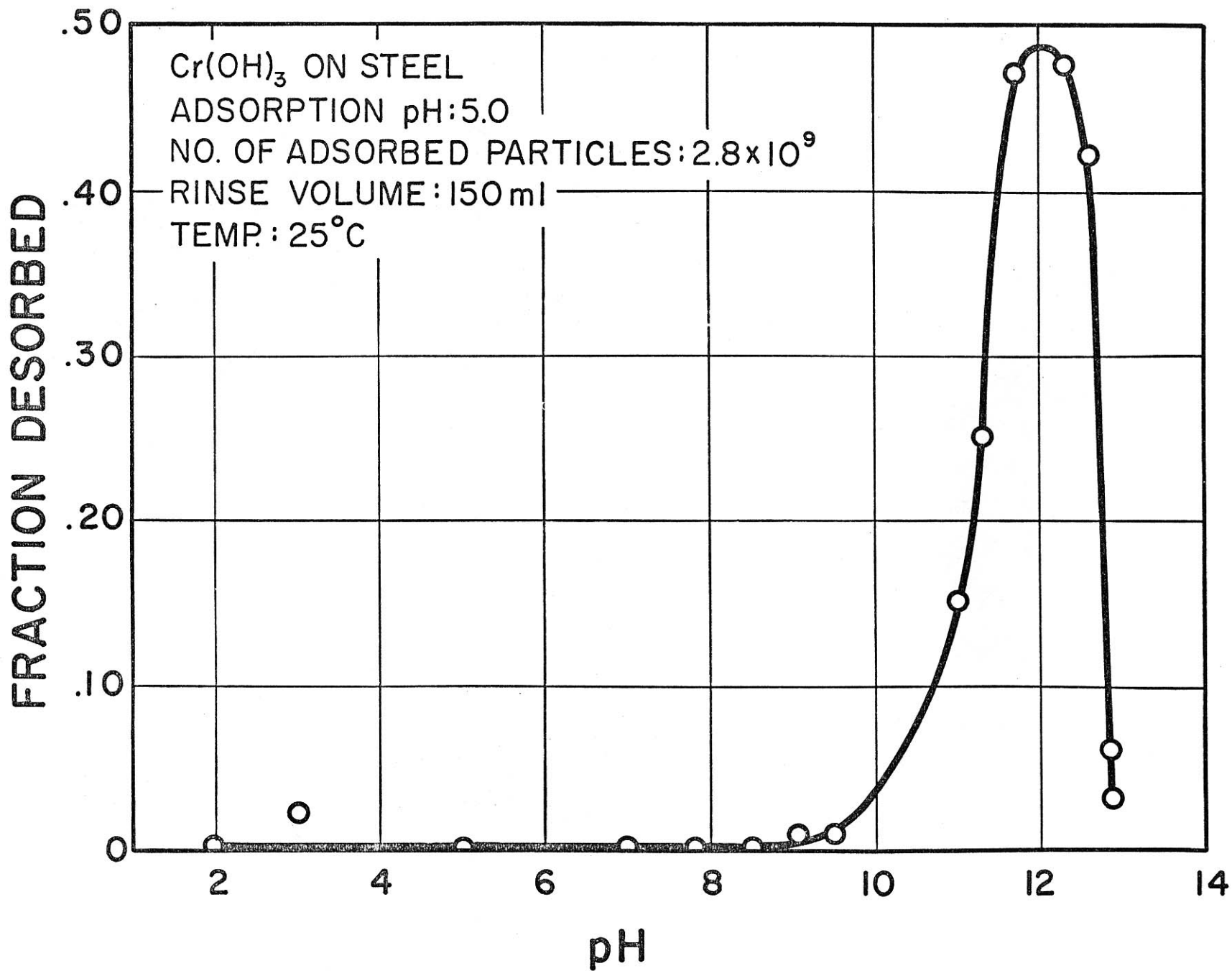


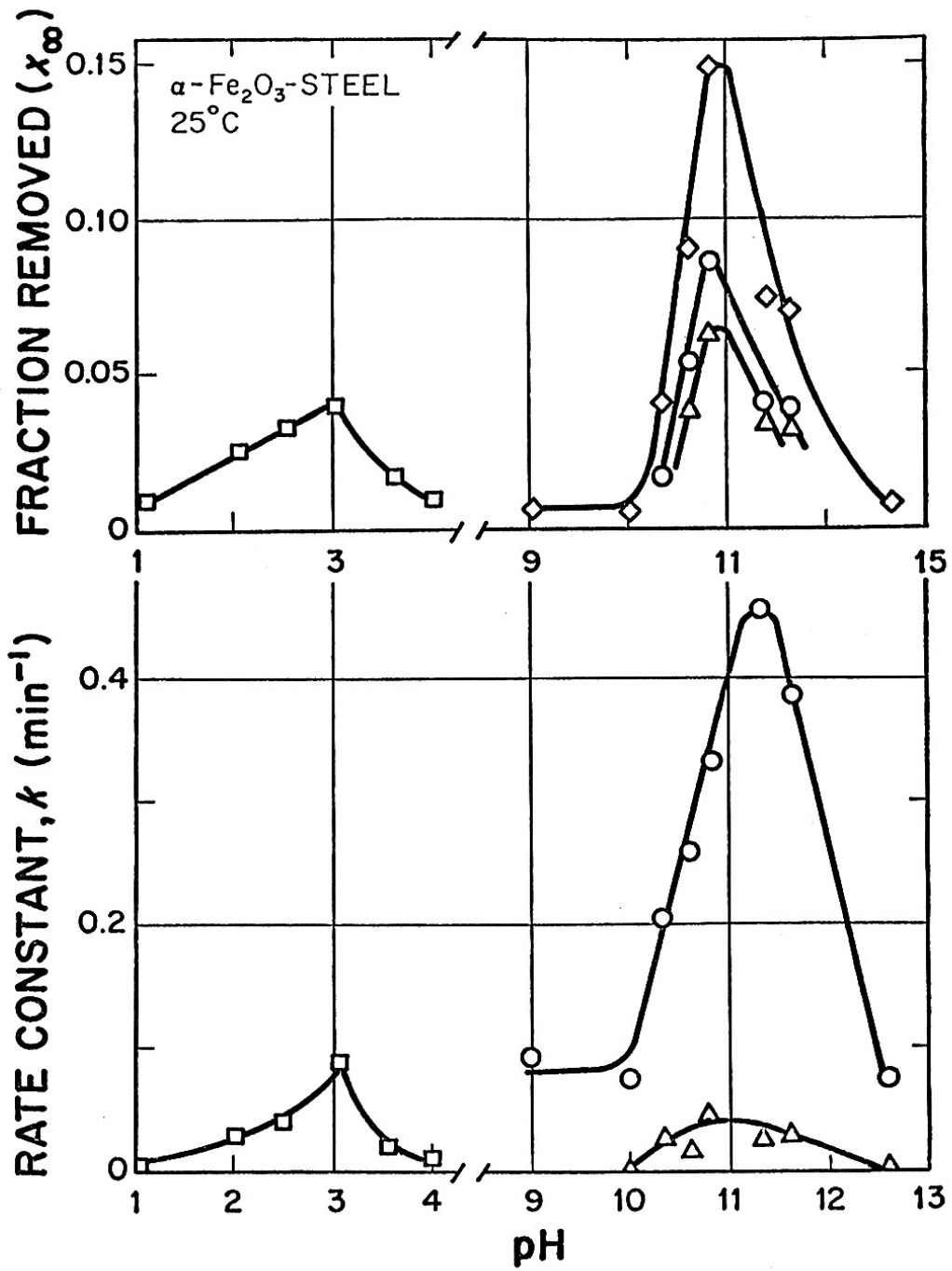


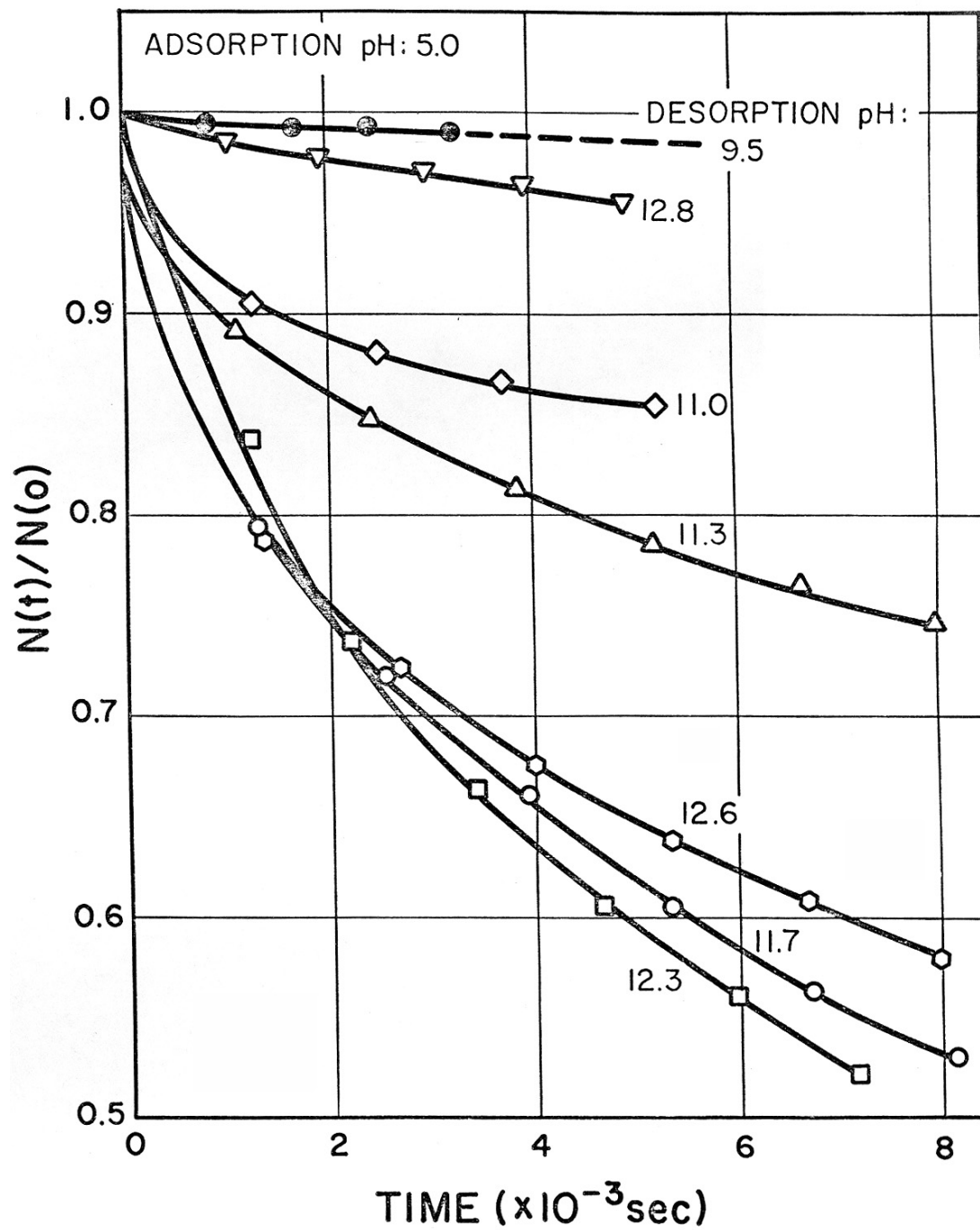


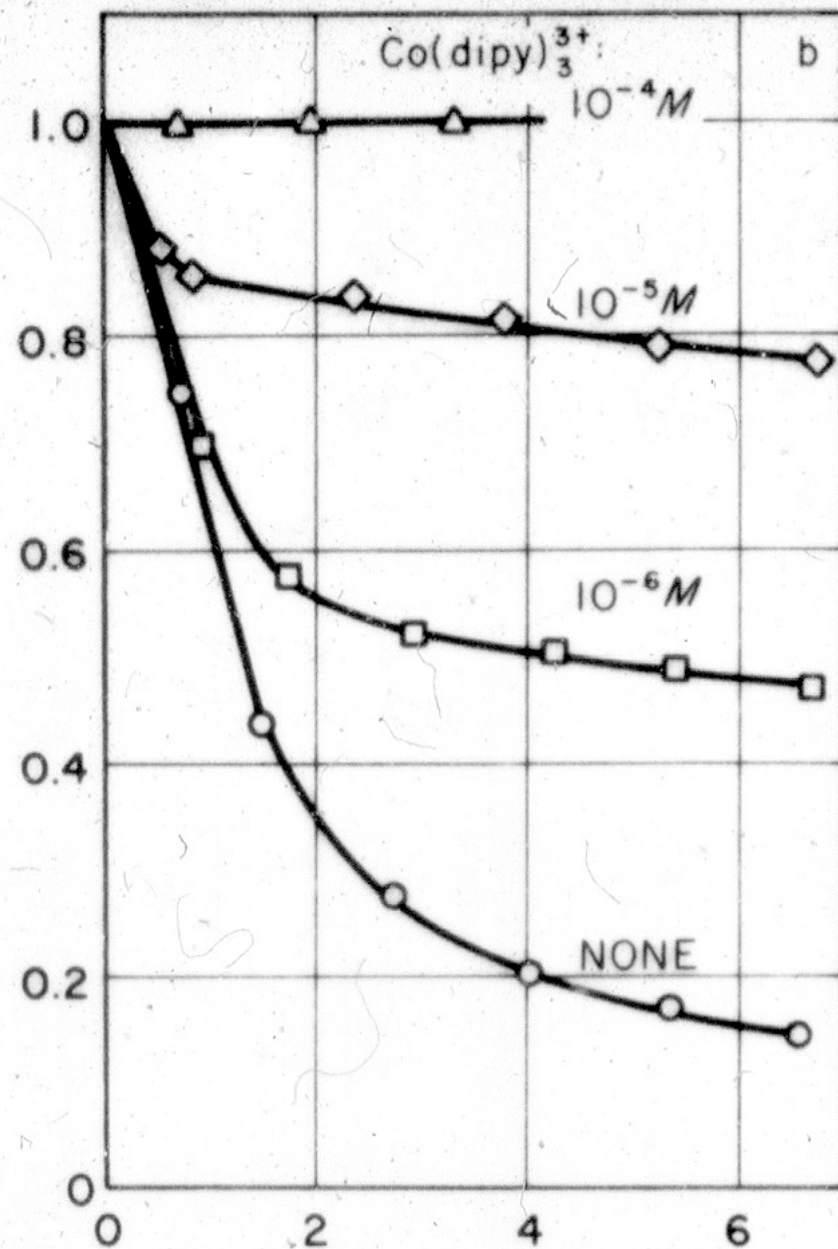
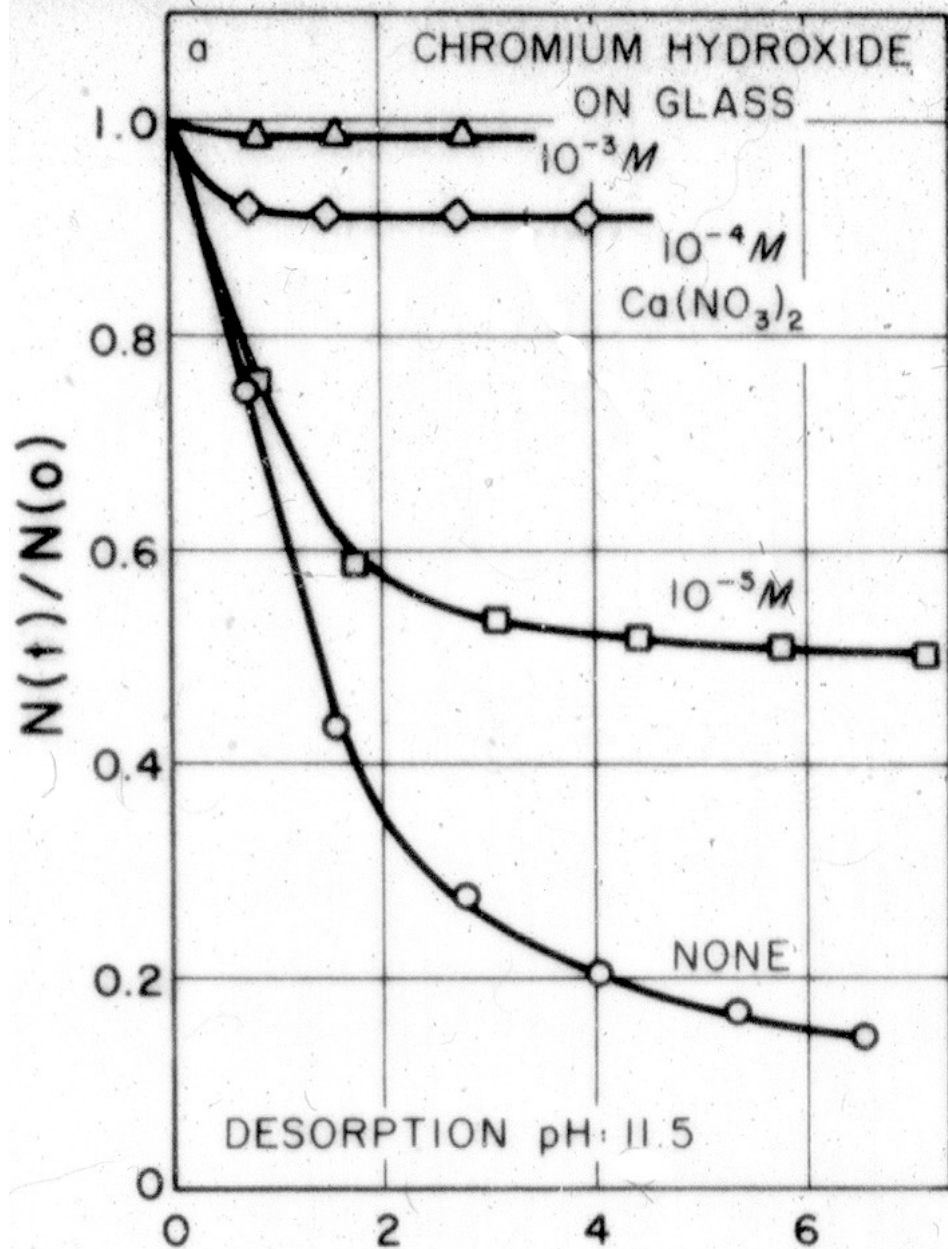










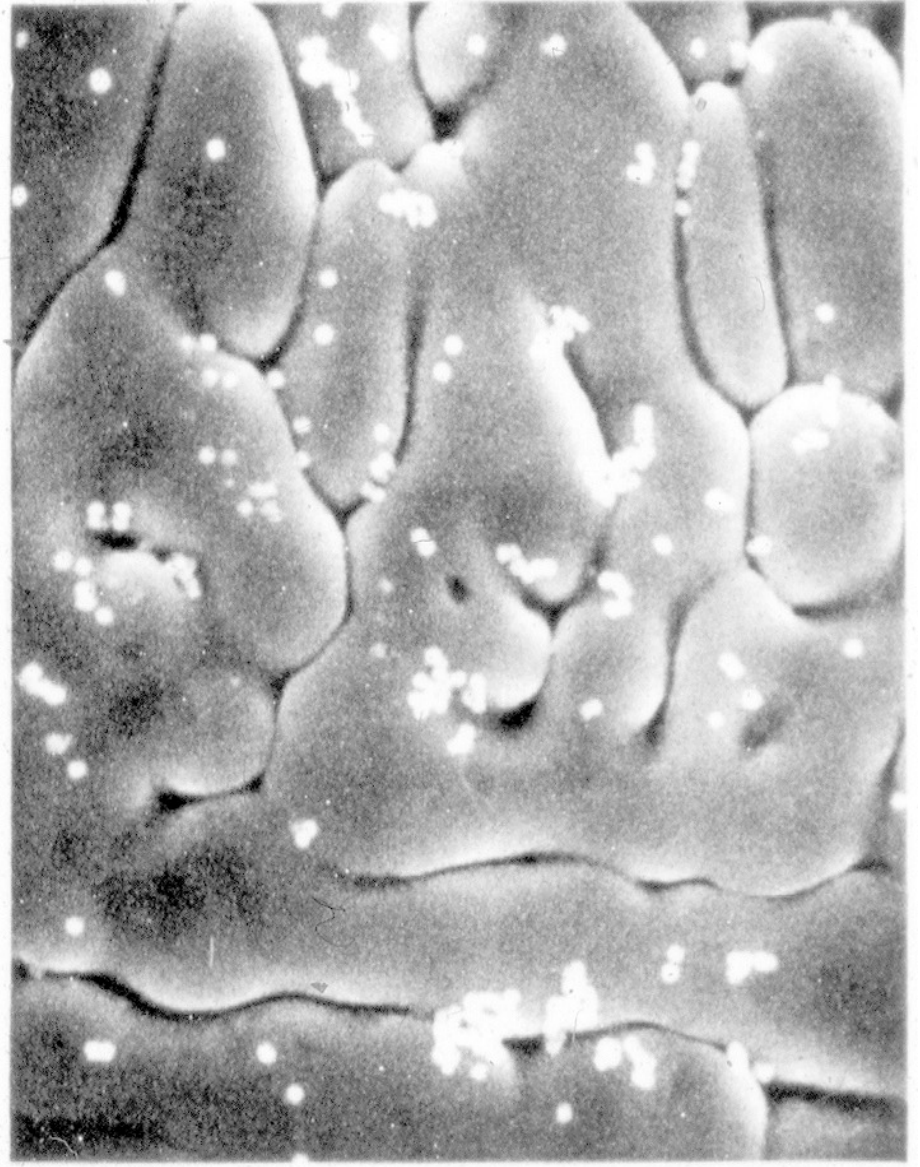


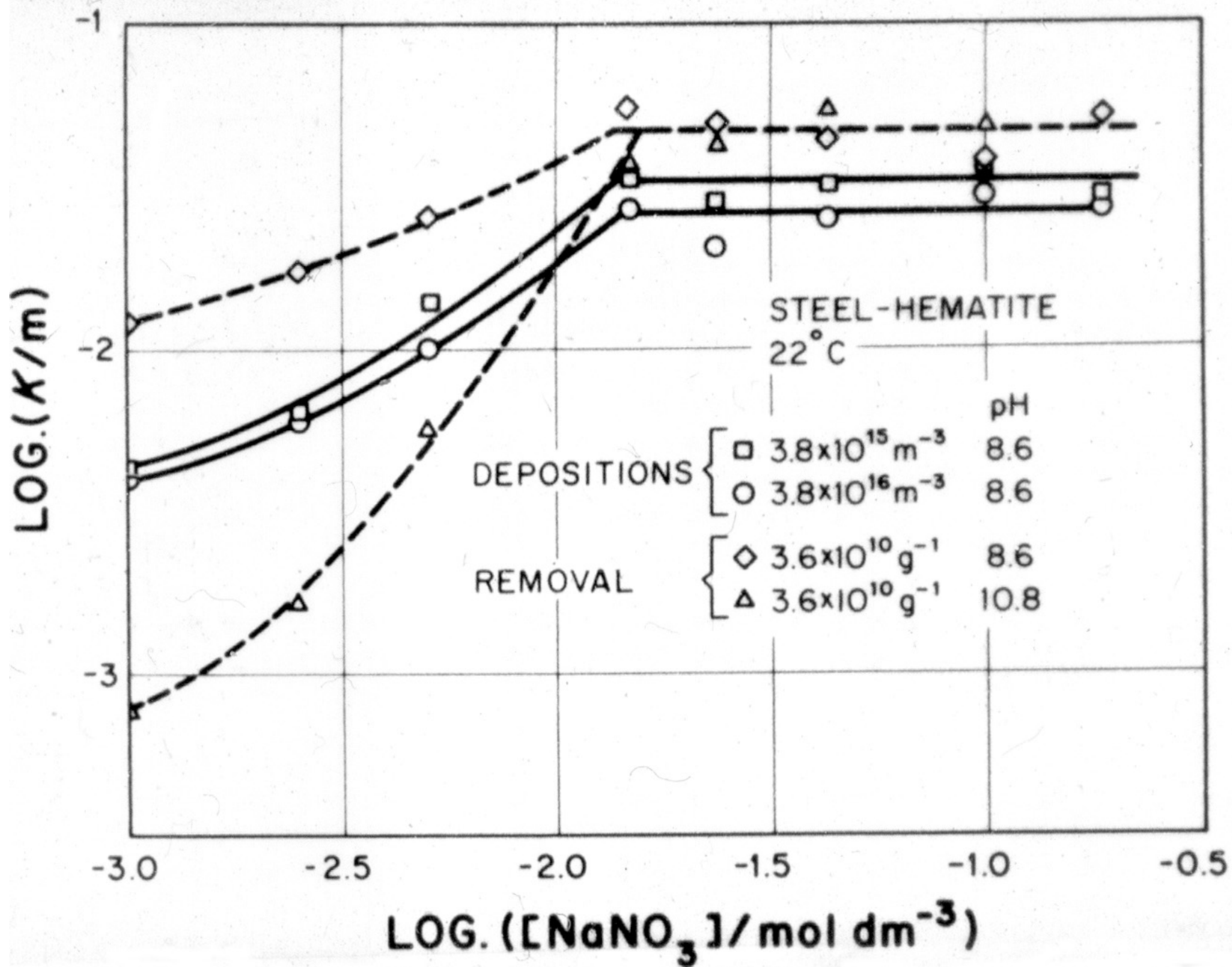
TIME ($\times 10^{-3}$ sec.)

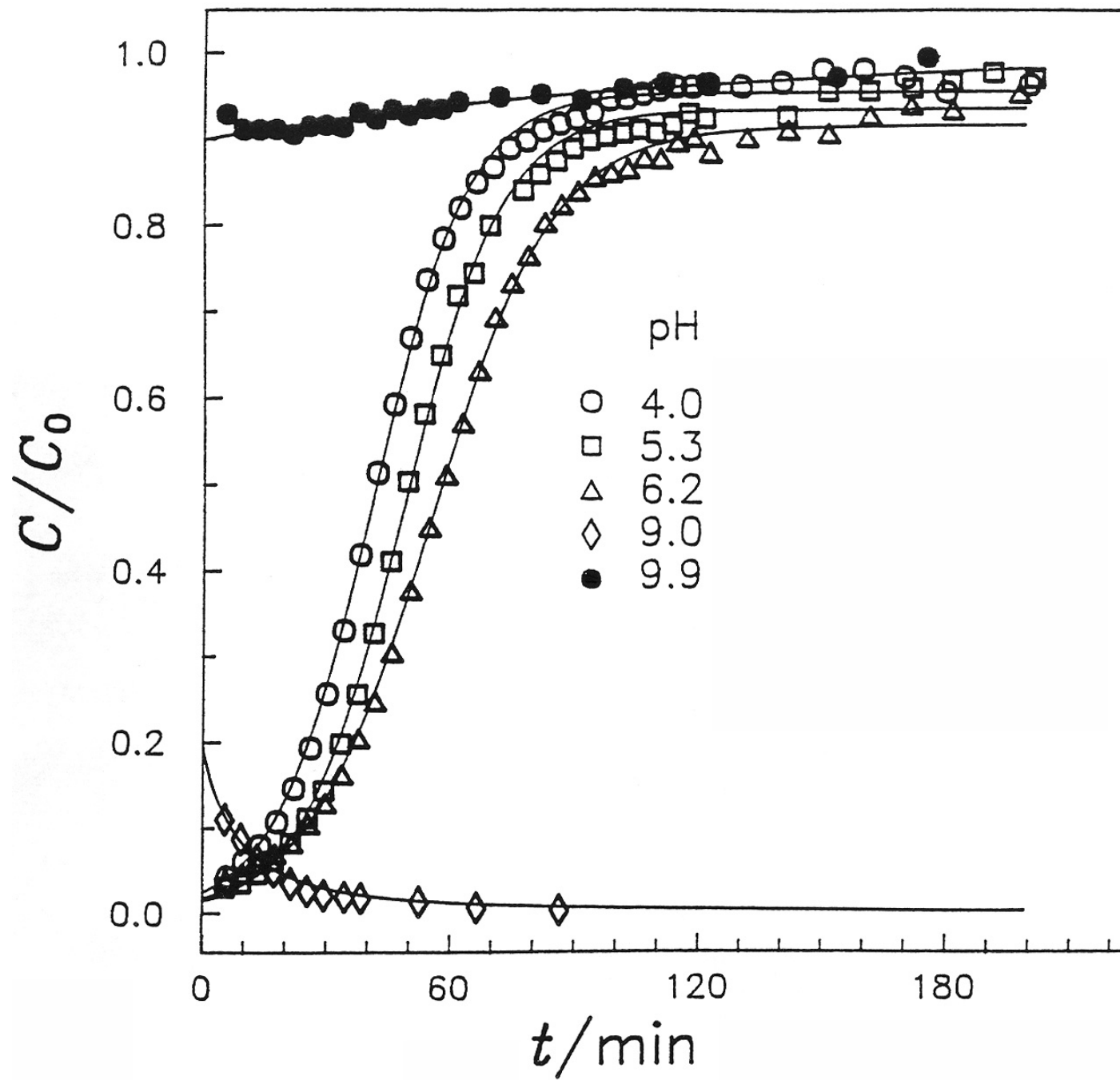
A

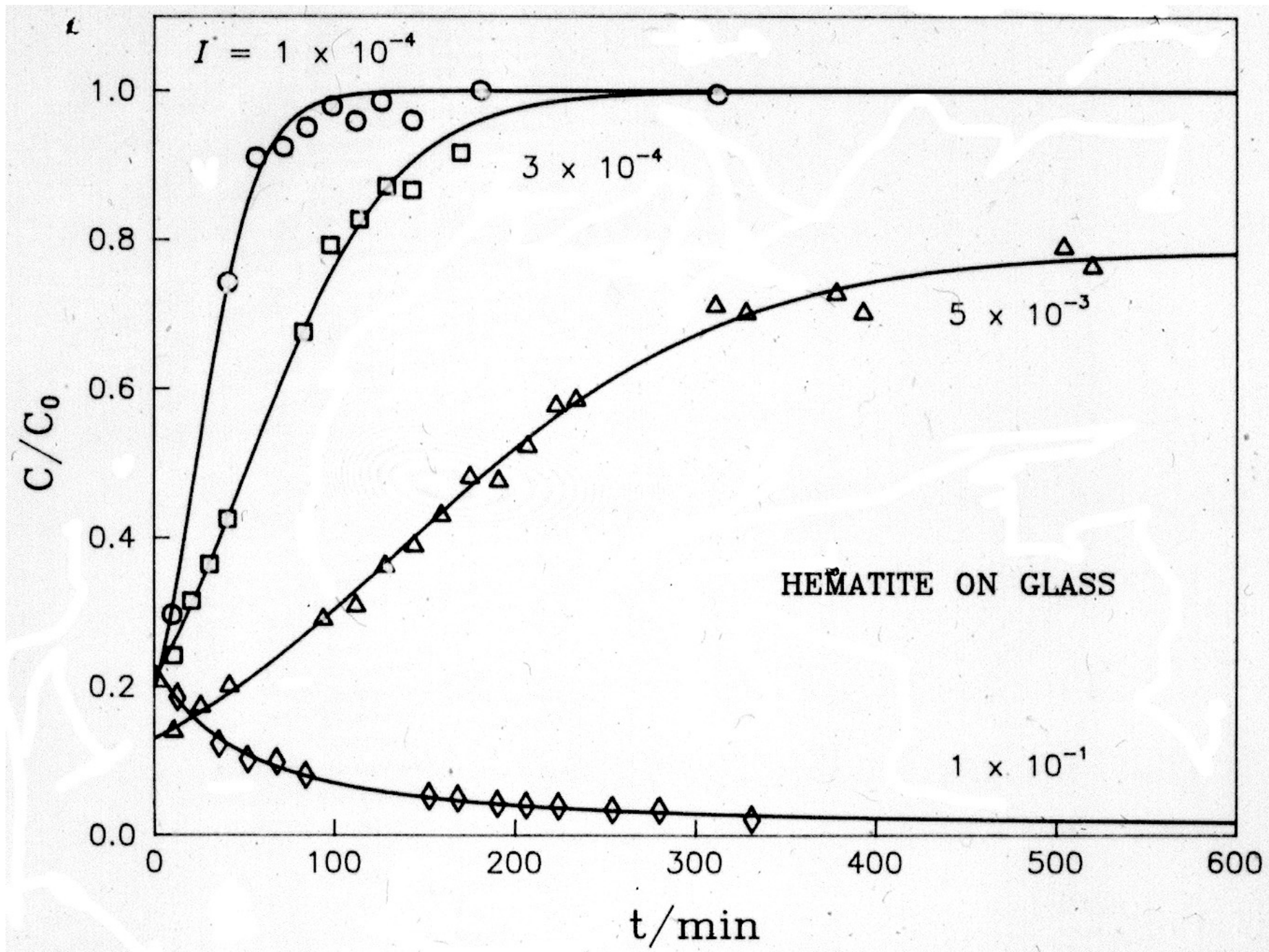


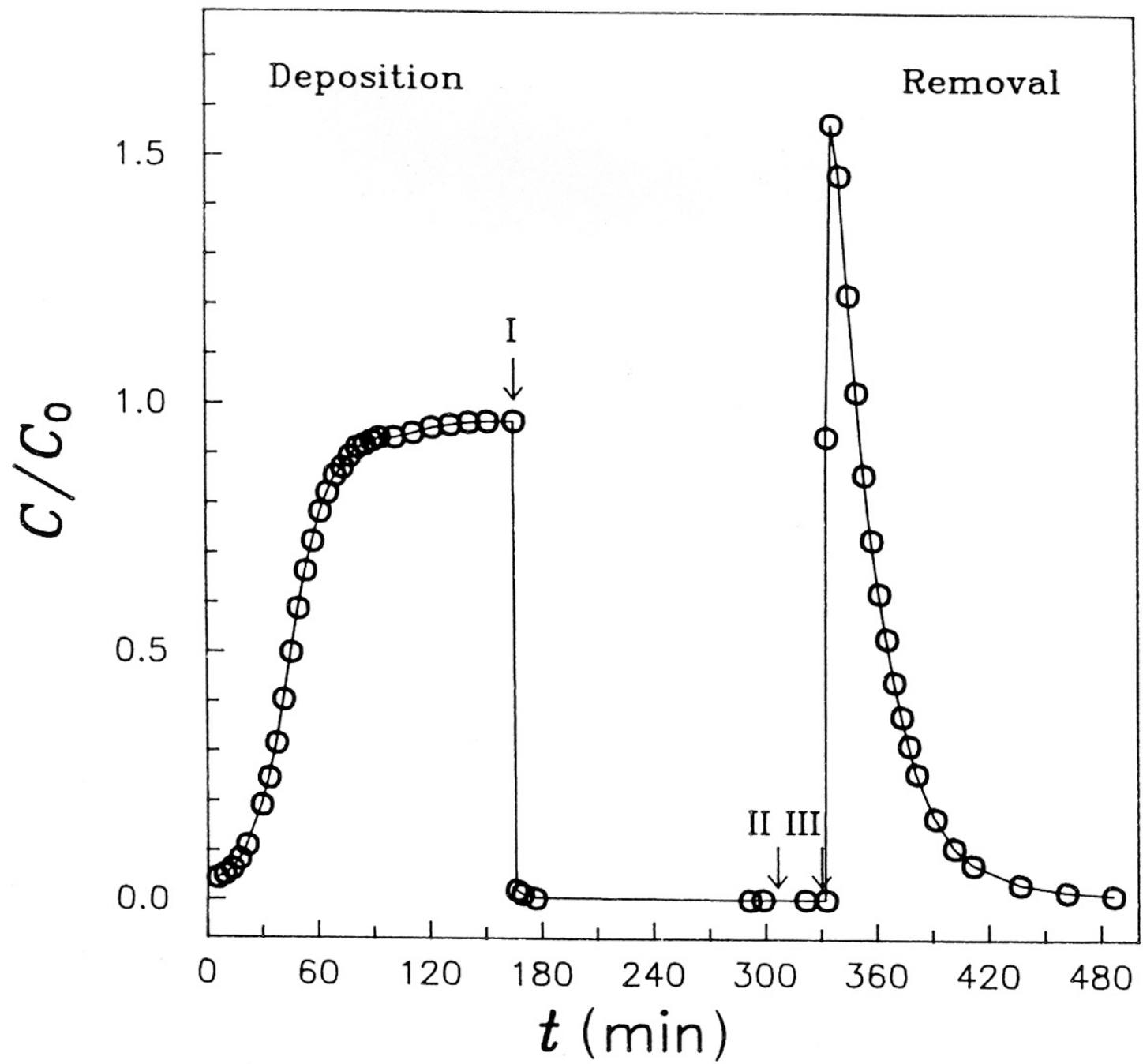
B

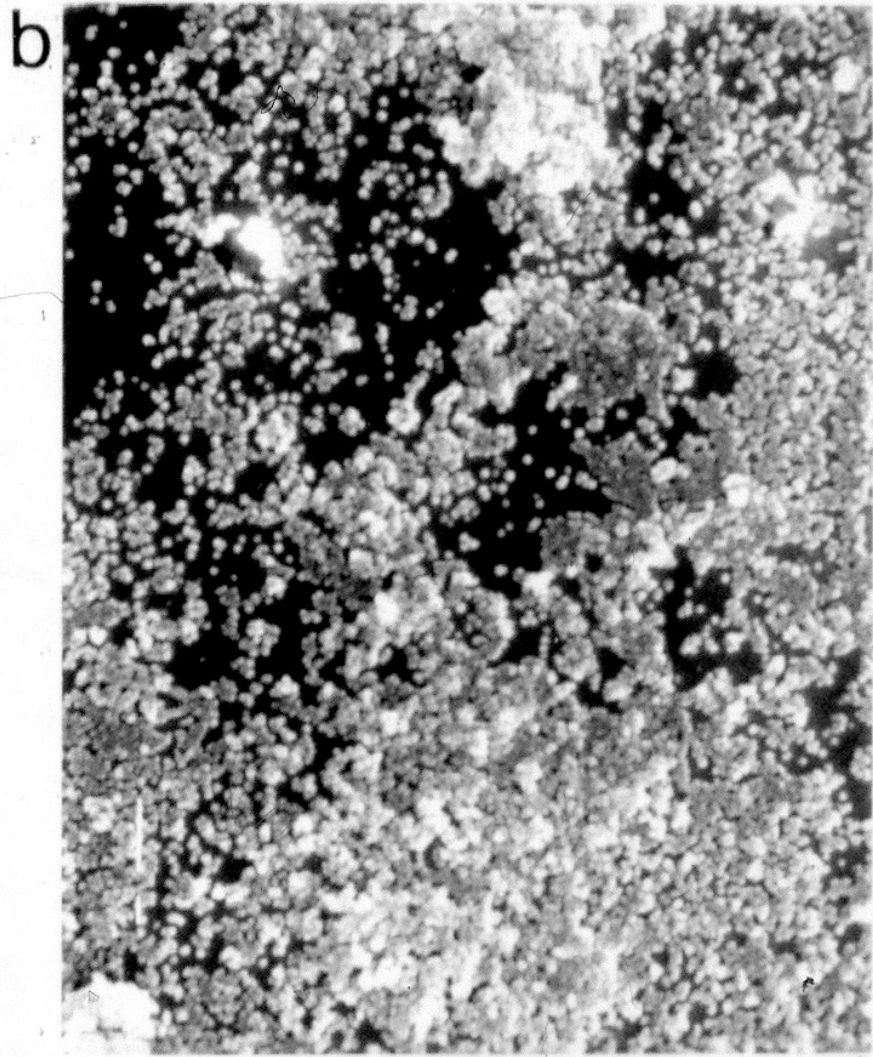
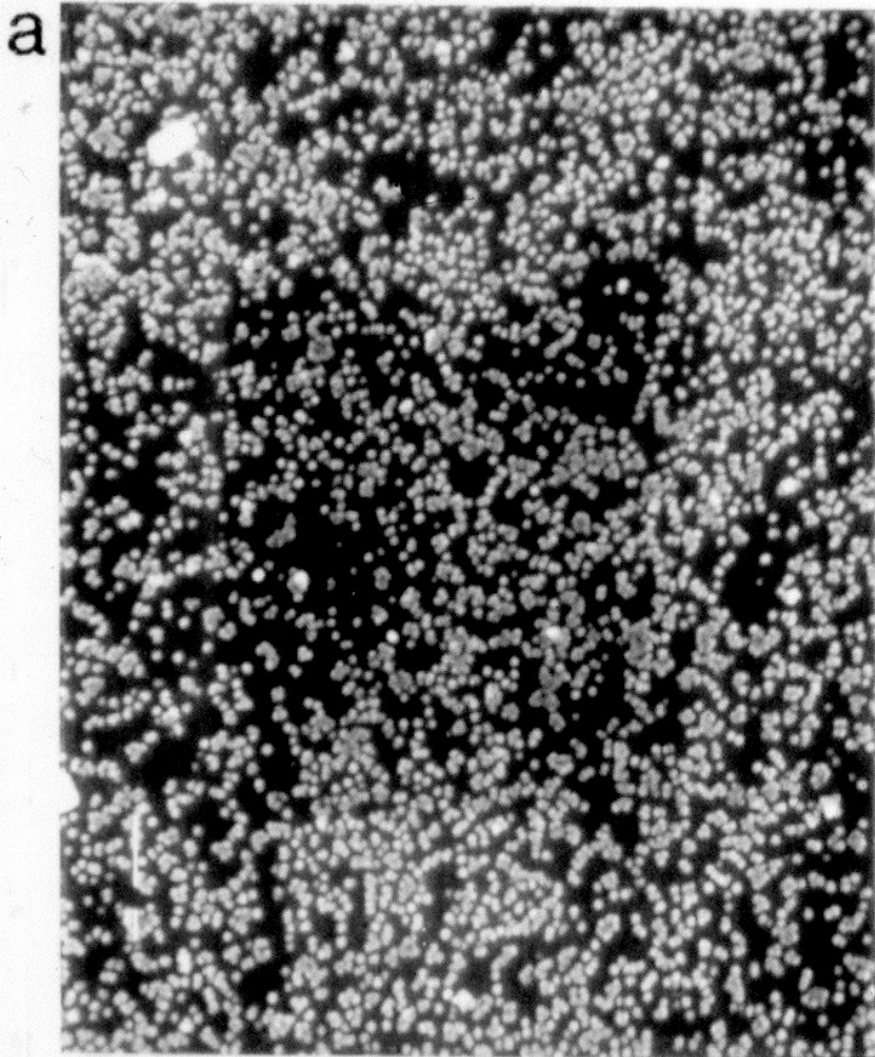




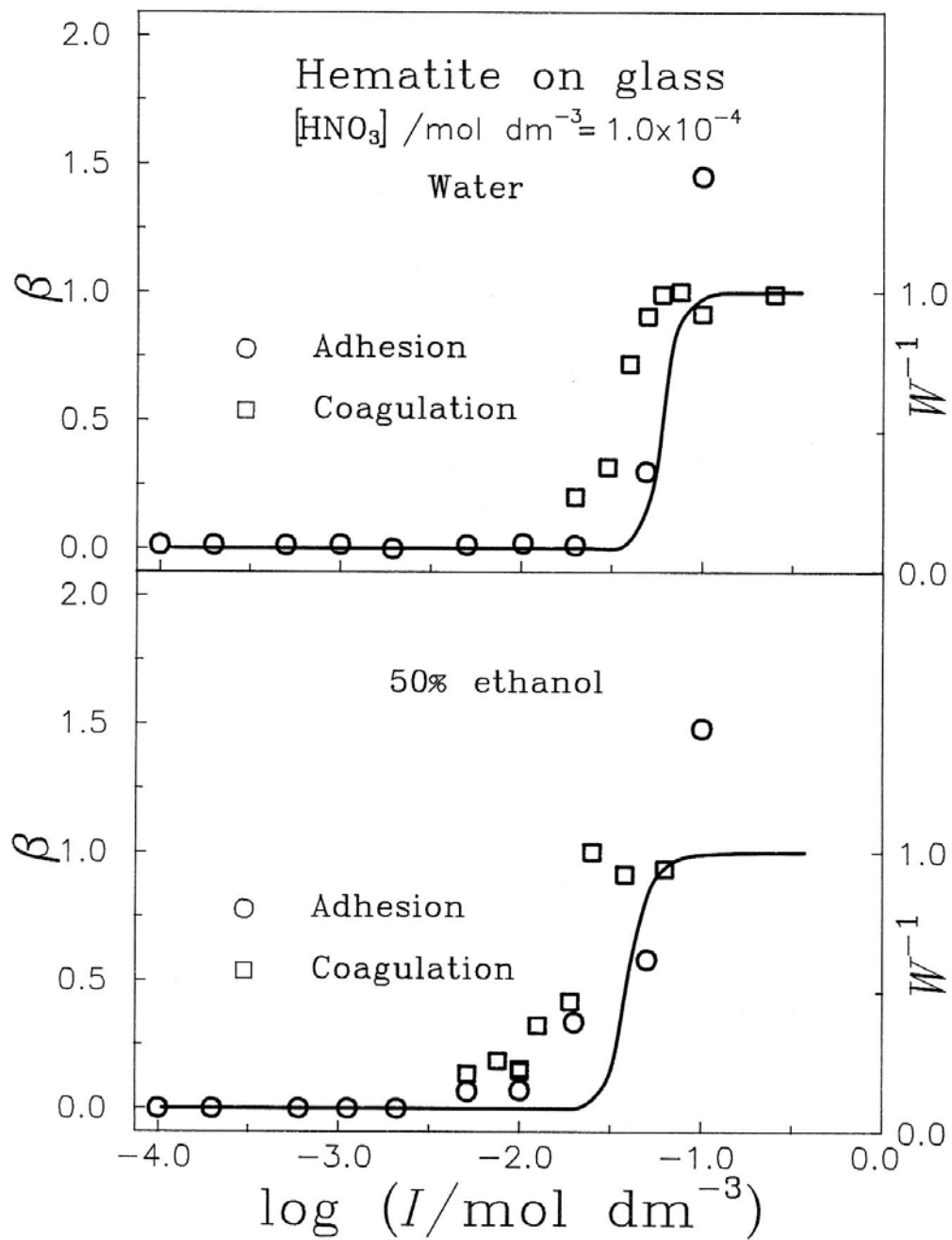


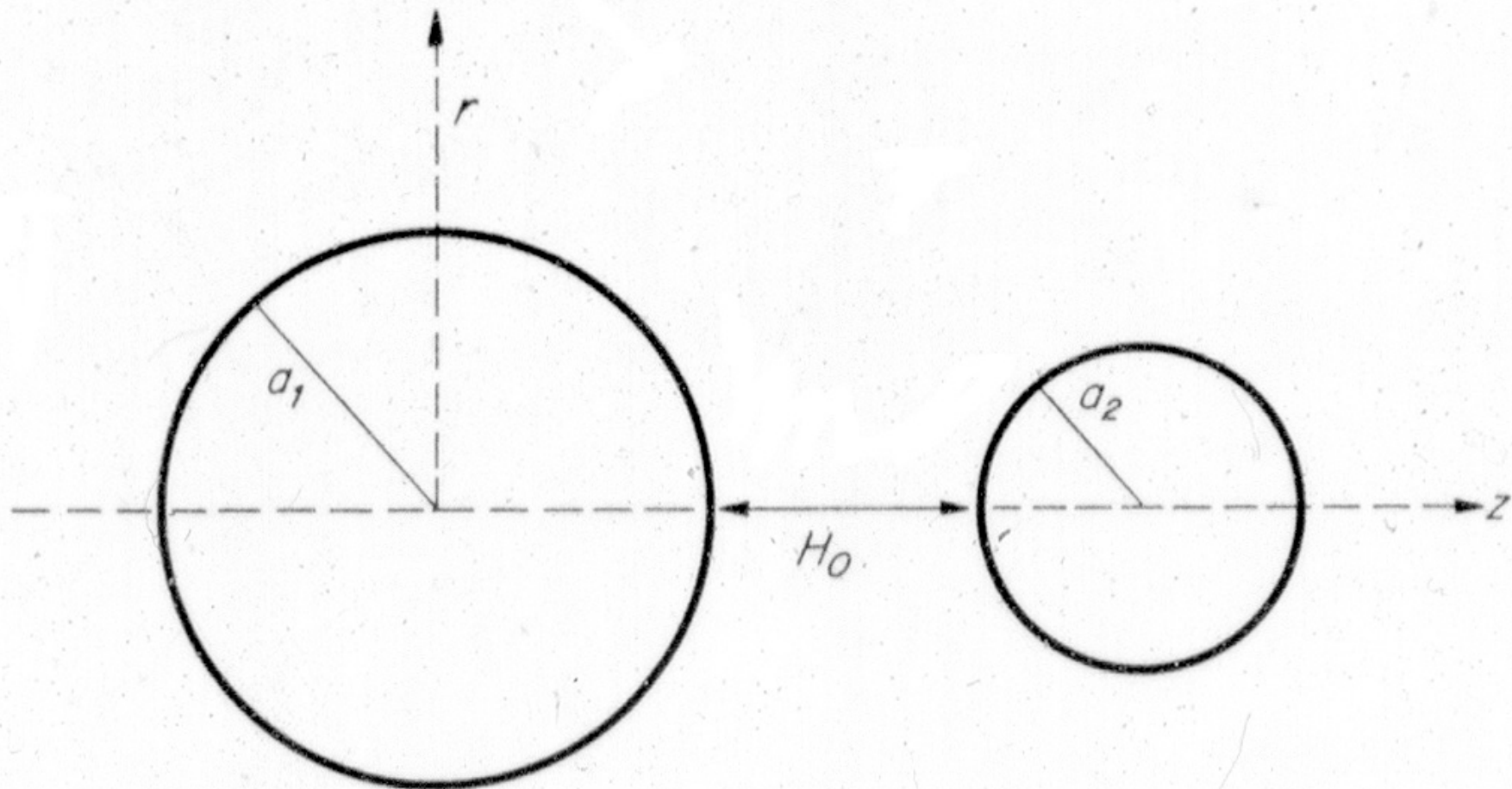


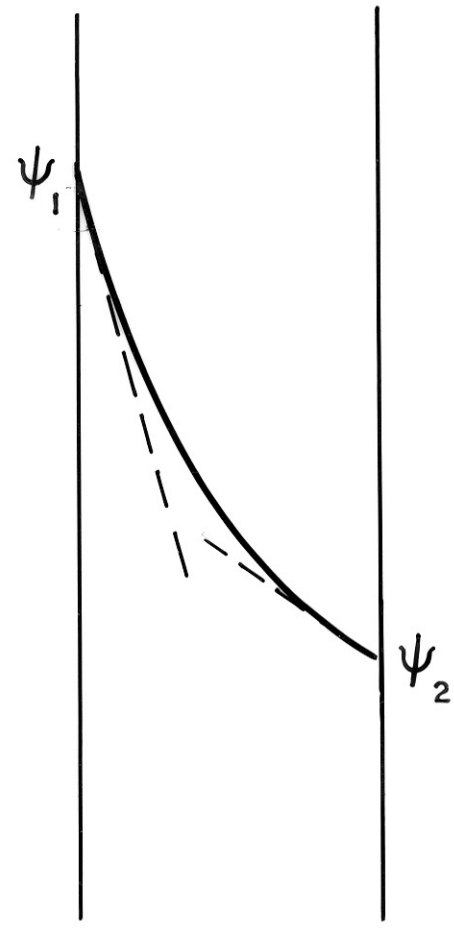
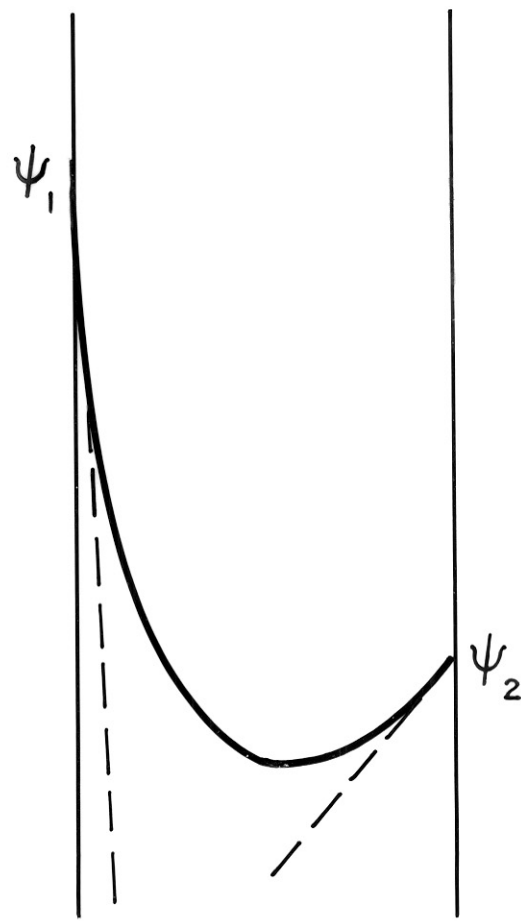
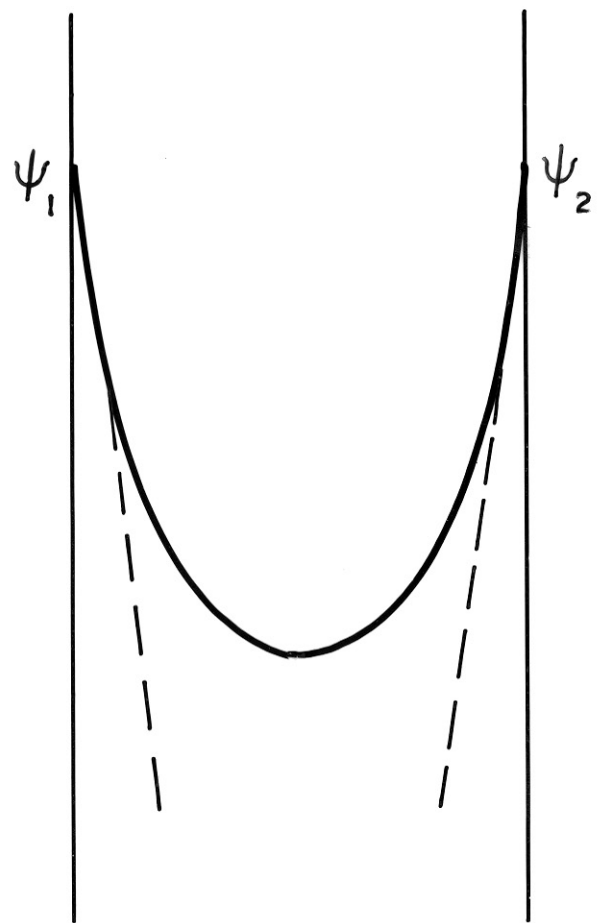




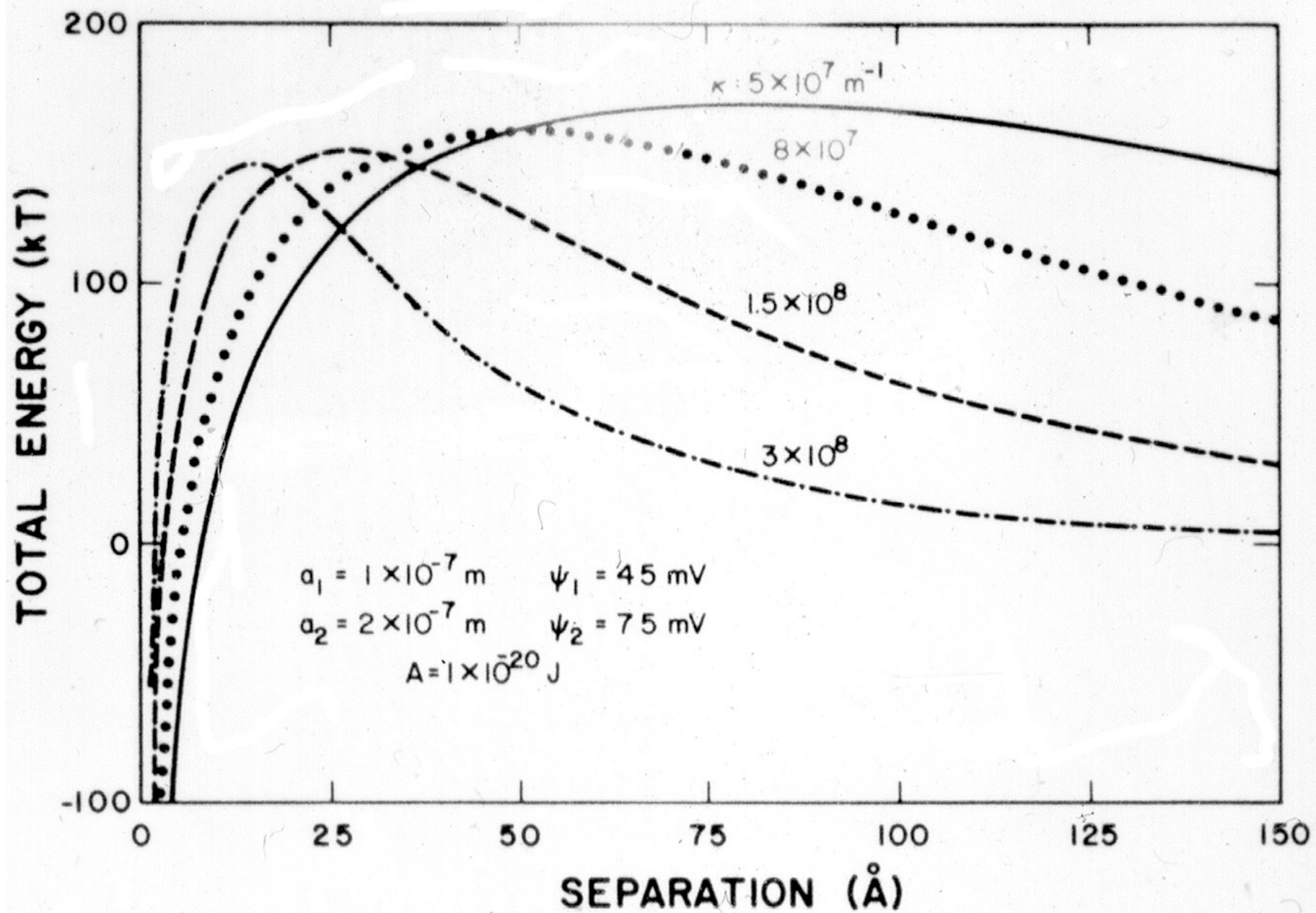
2 μm

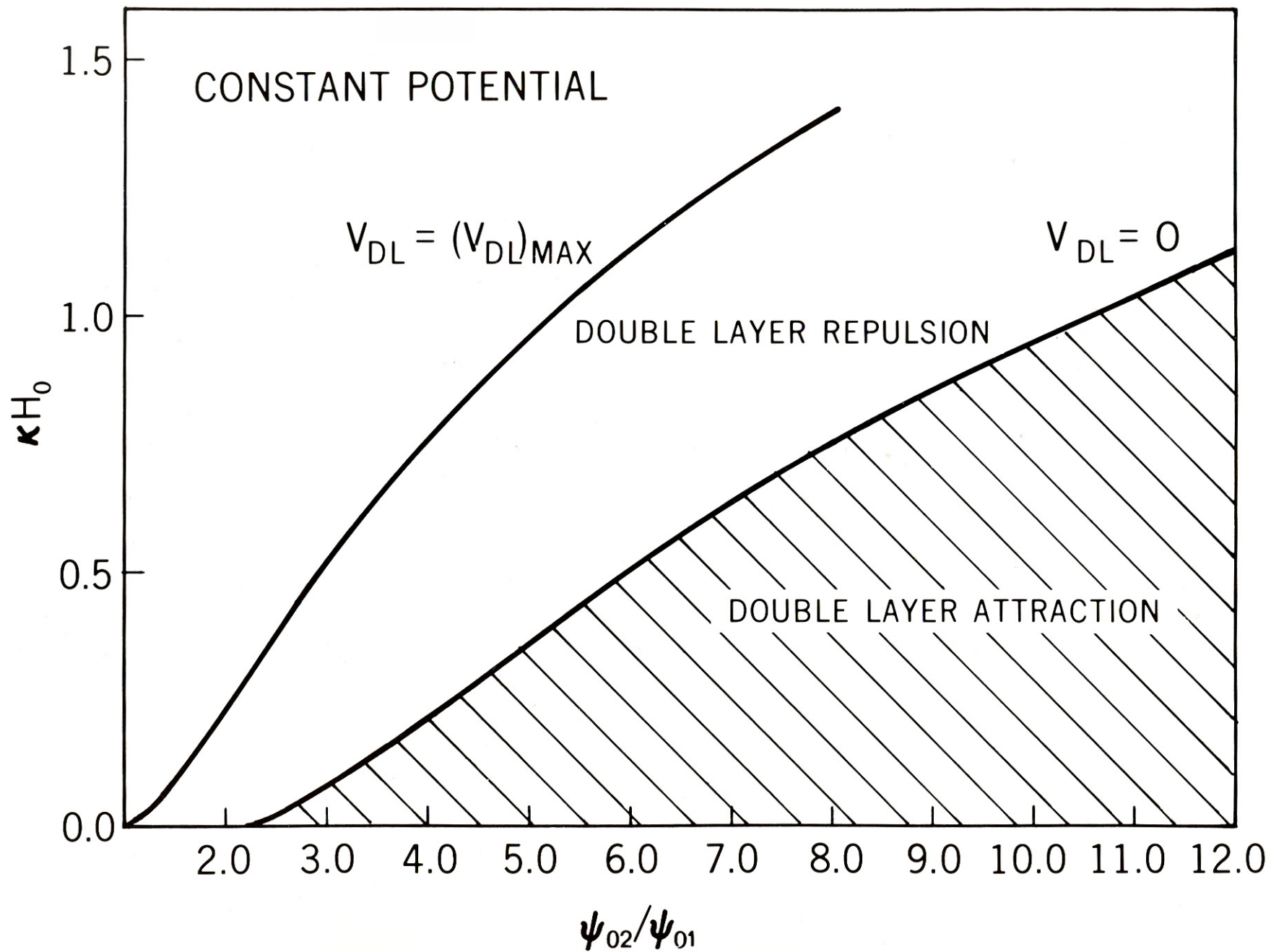


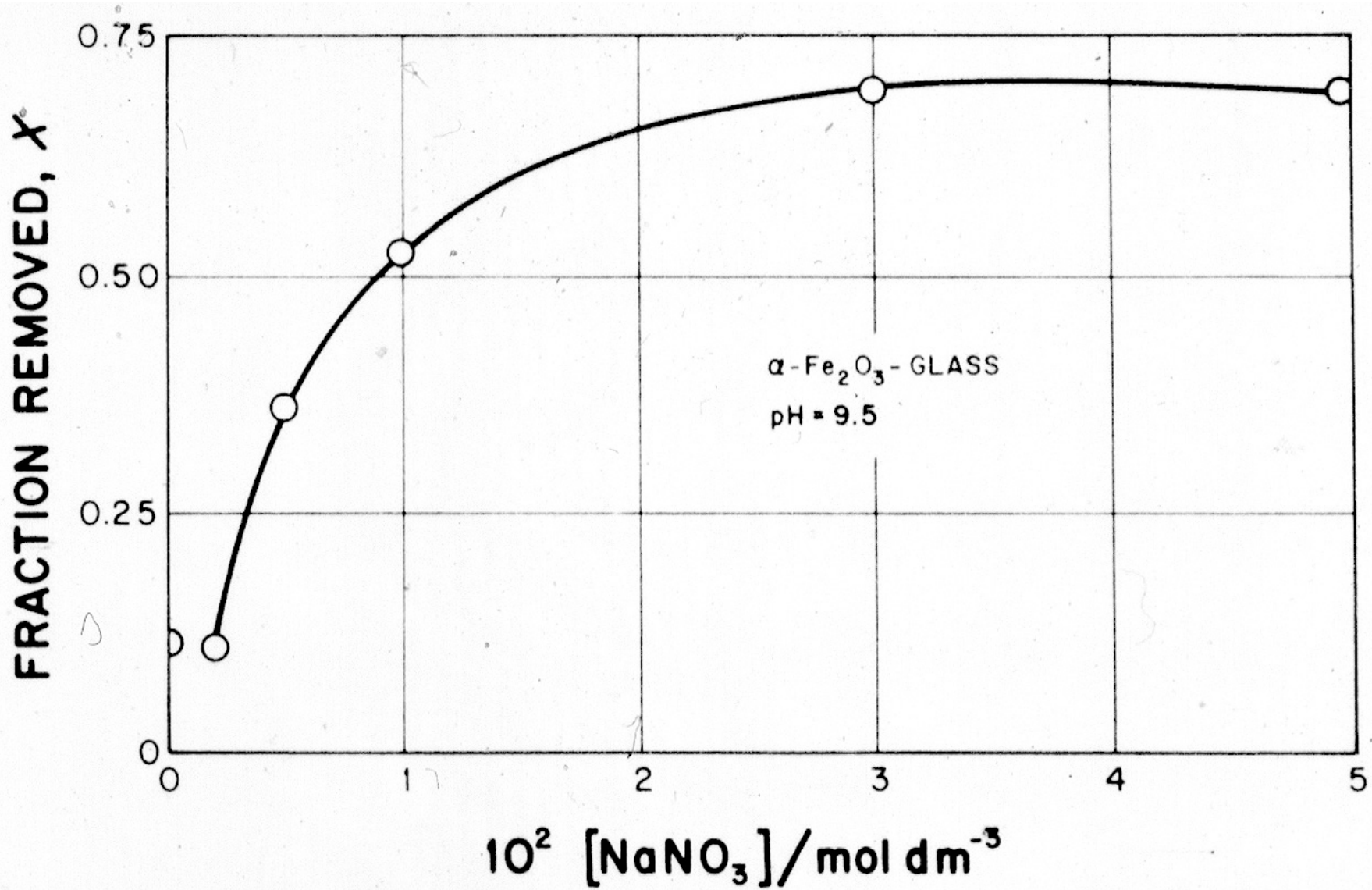


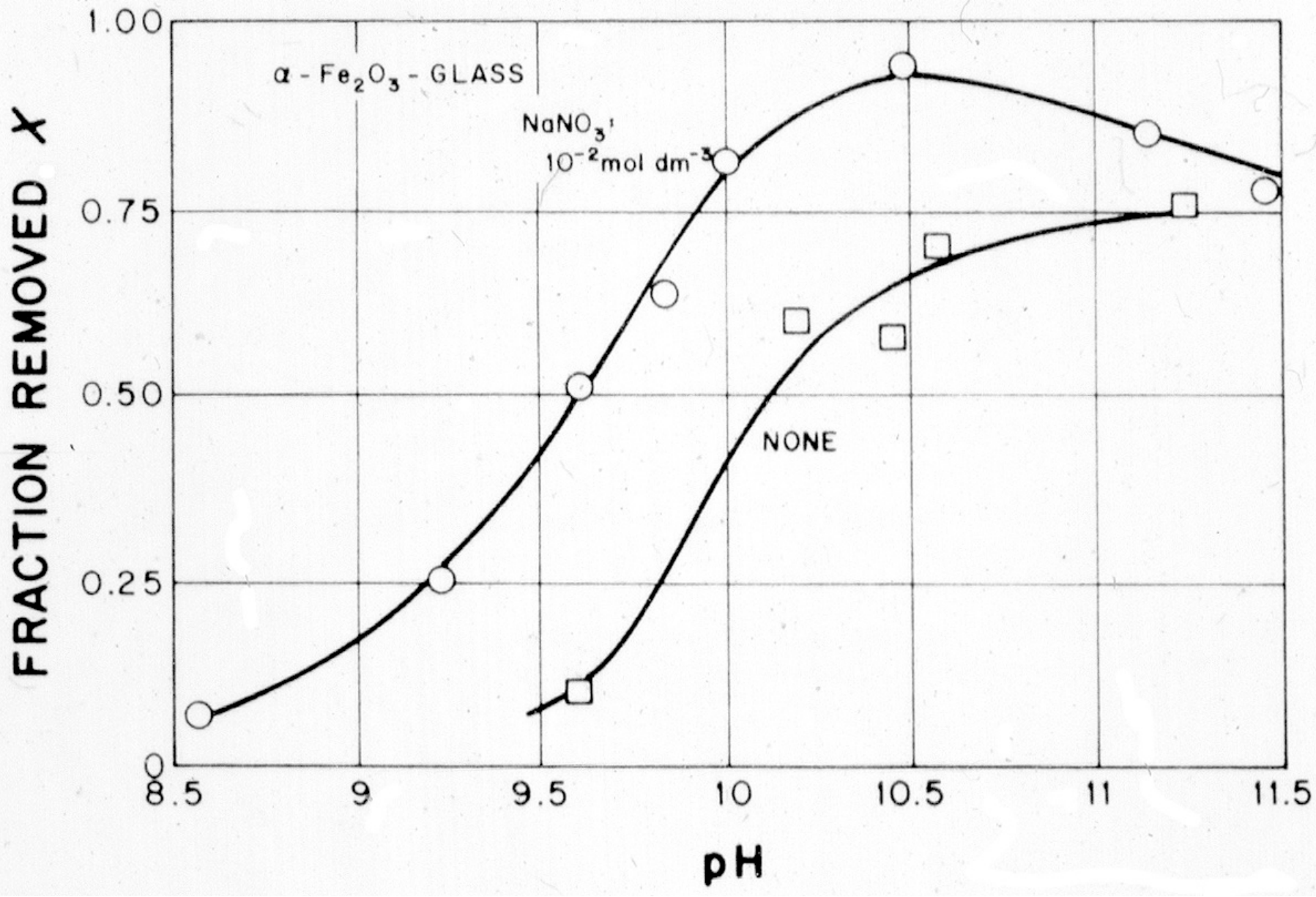


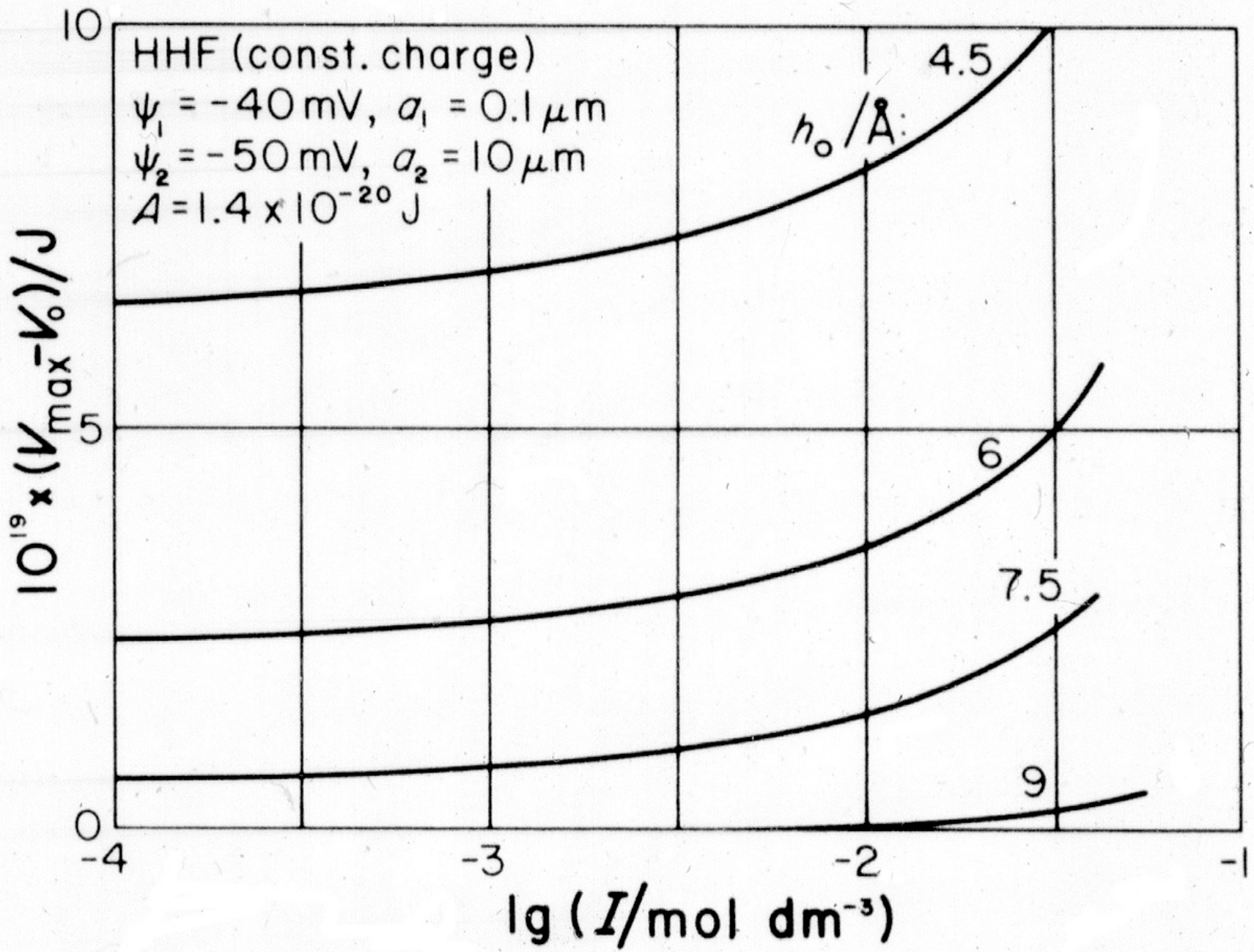
$$\psi_1 \psi_2 > 0$$

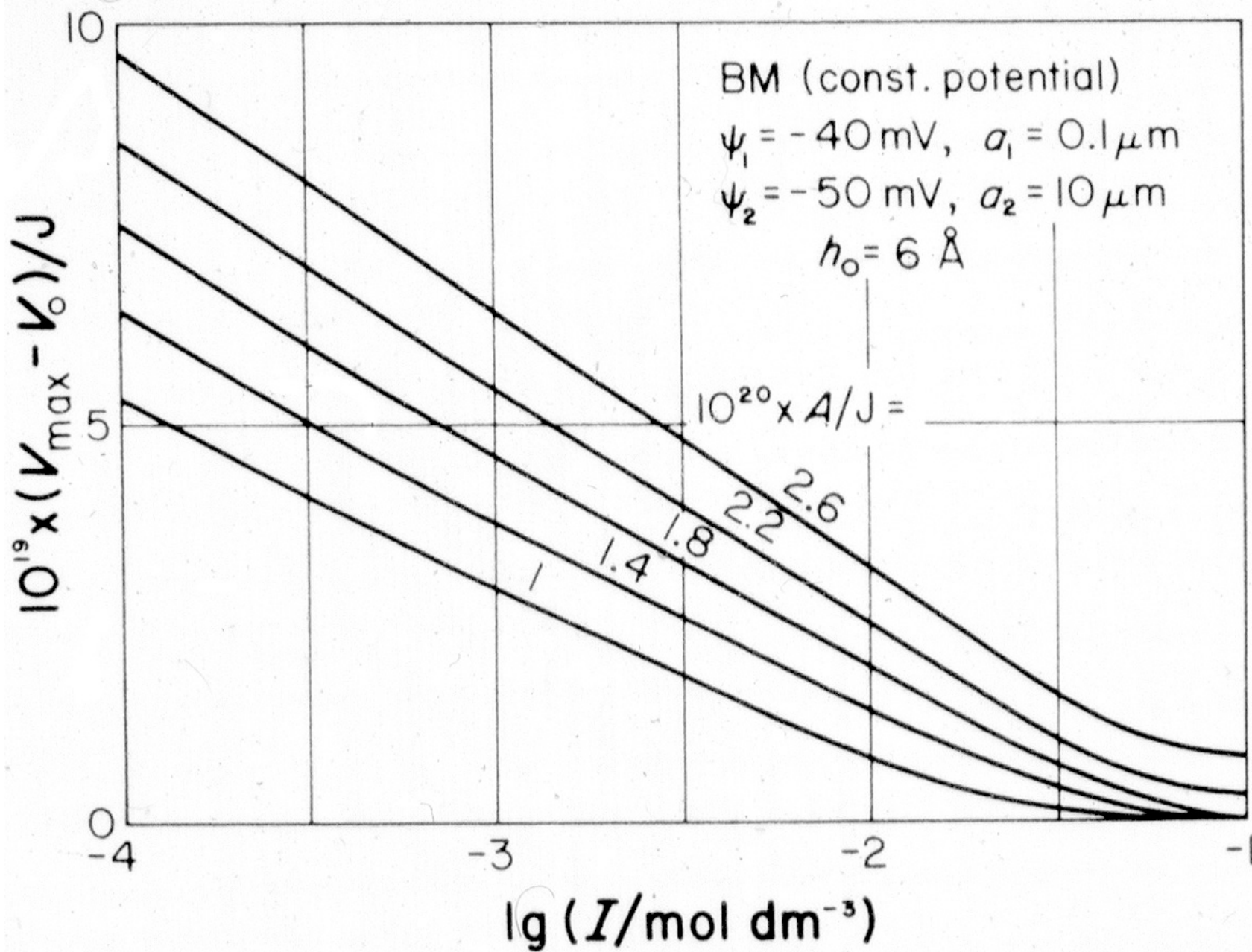


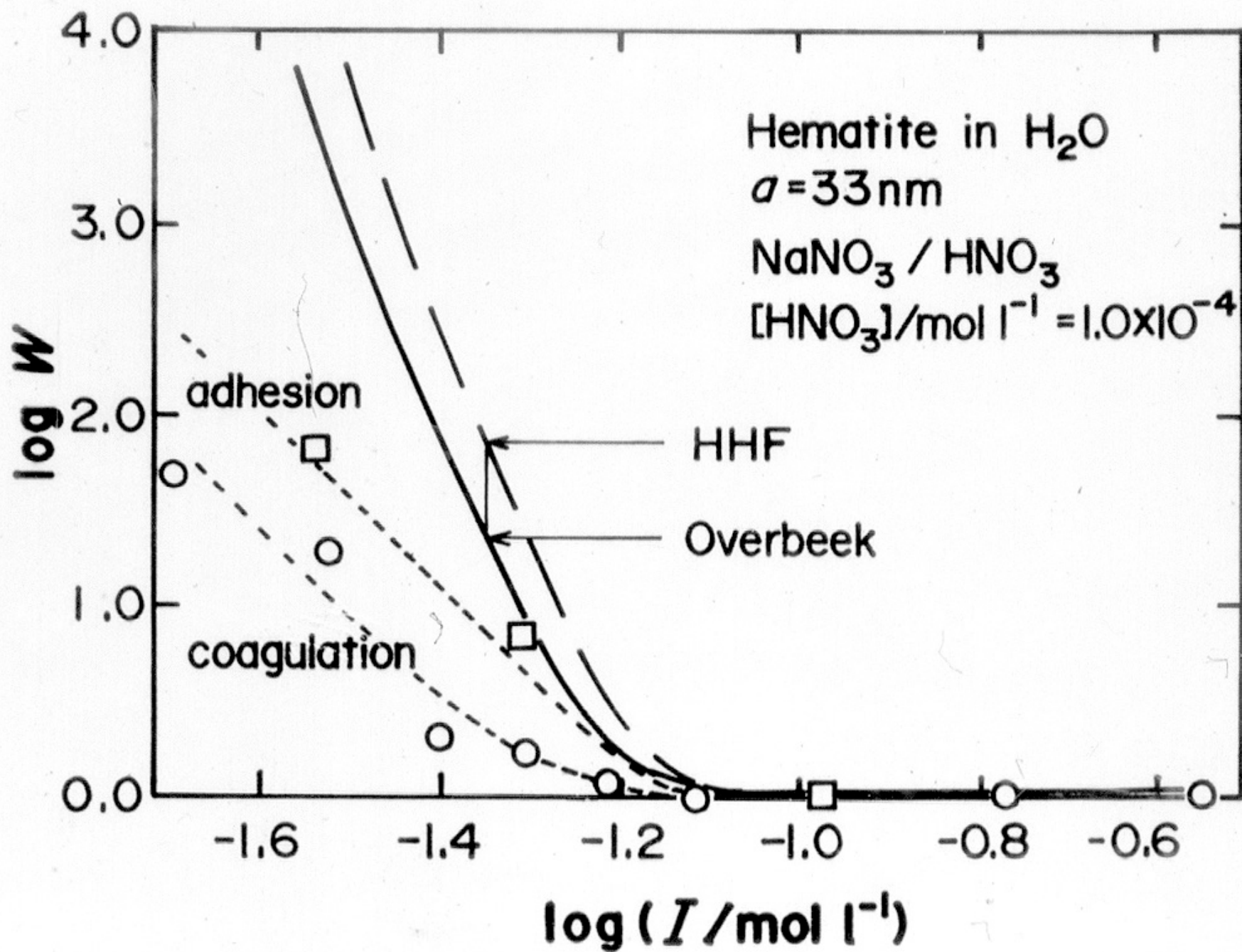


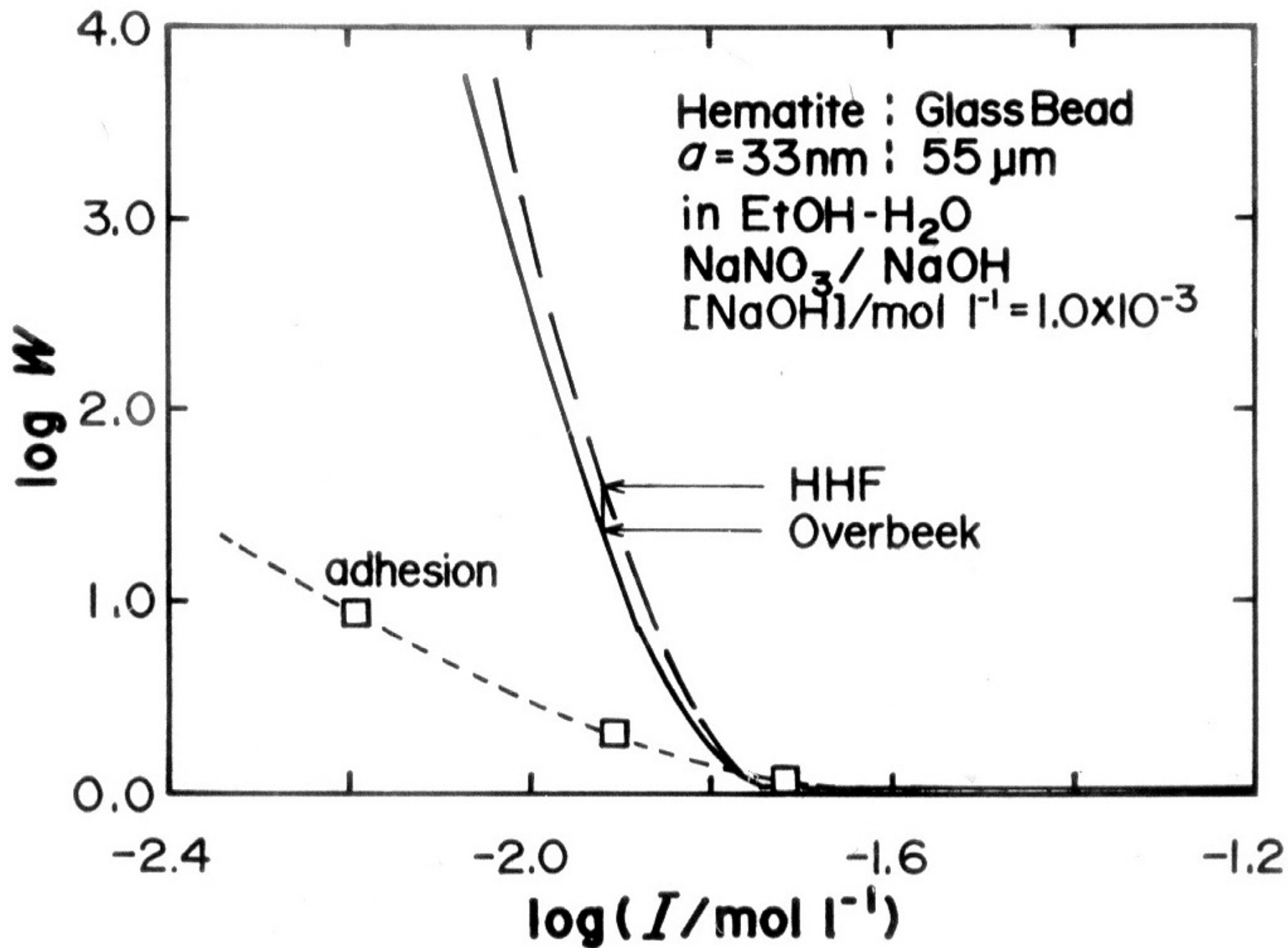


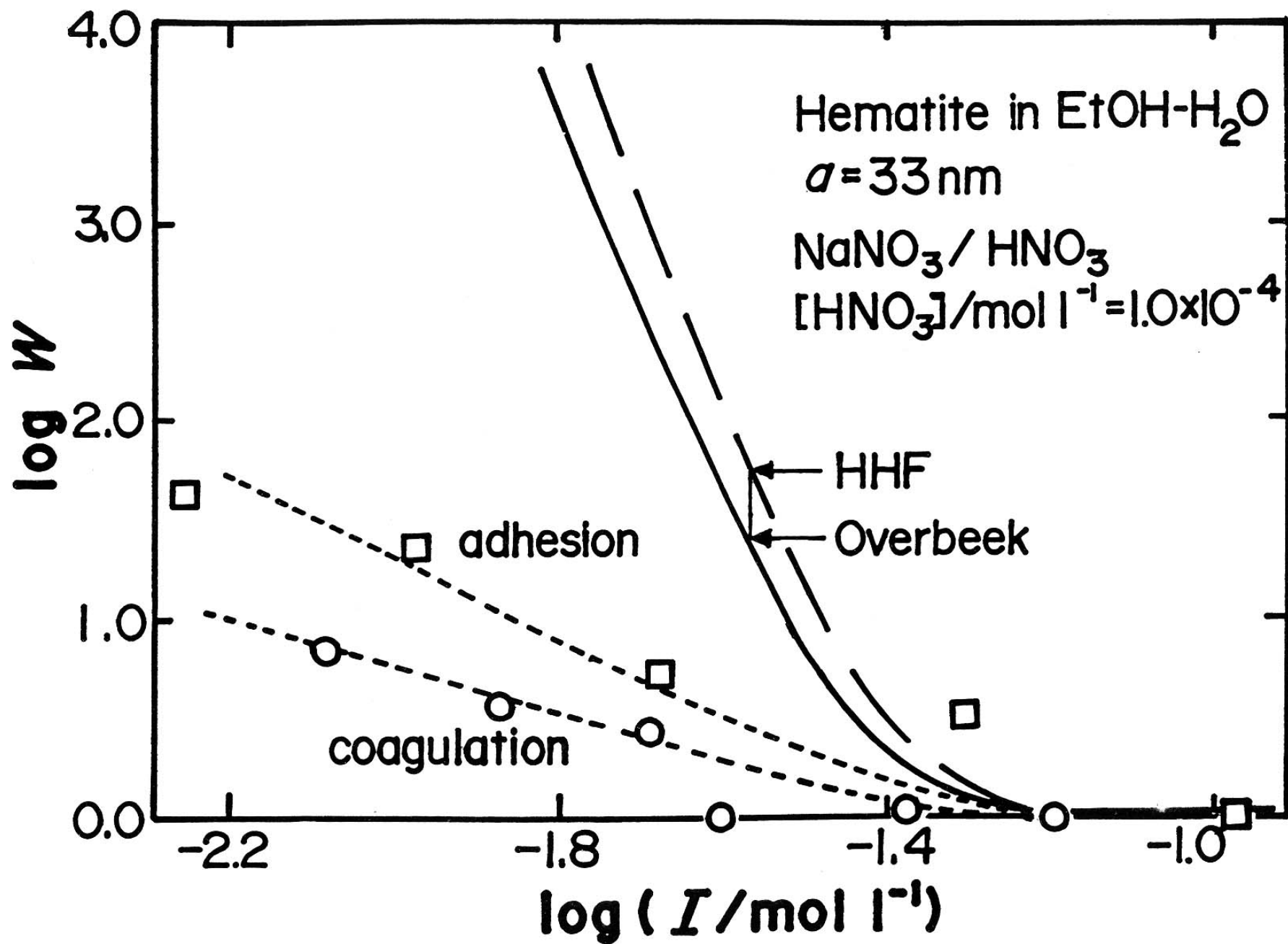


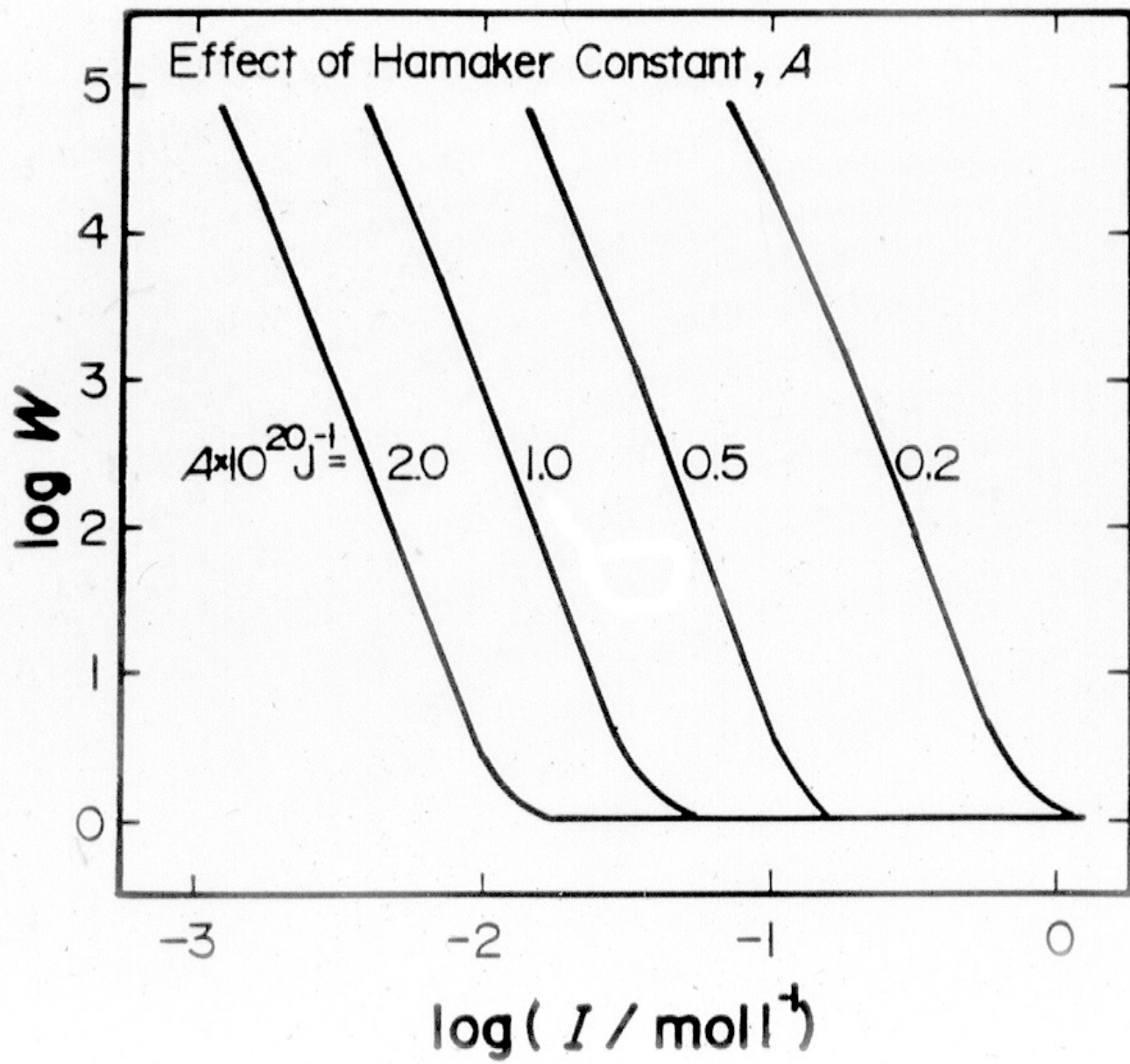




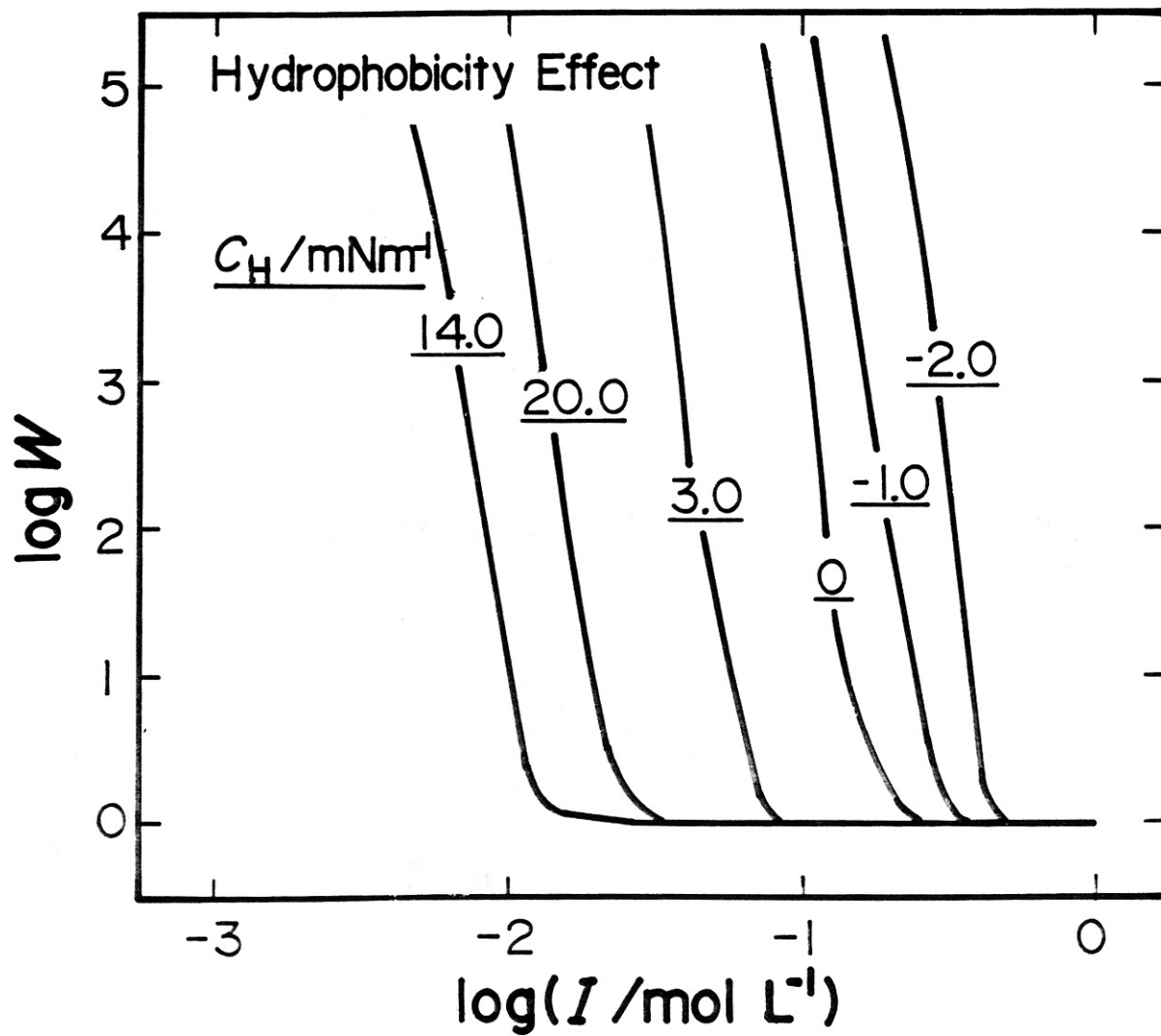








$\psi_s = 20.54 \text{ mV}$
 $a = 100 \text{ nm}$
 $T = 298 \text{ K}$
 $\epsilon_r = 78.54$
 Hydrodynamic Effect
 1-1 electrolyte



$$\psi_s = 30.82 \text{ mV}$$

$$a = 100 \text{ nm}$$

$$T = 298 \text{ K}$$

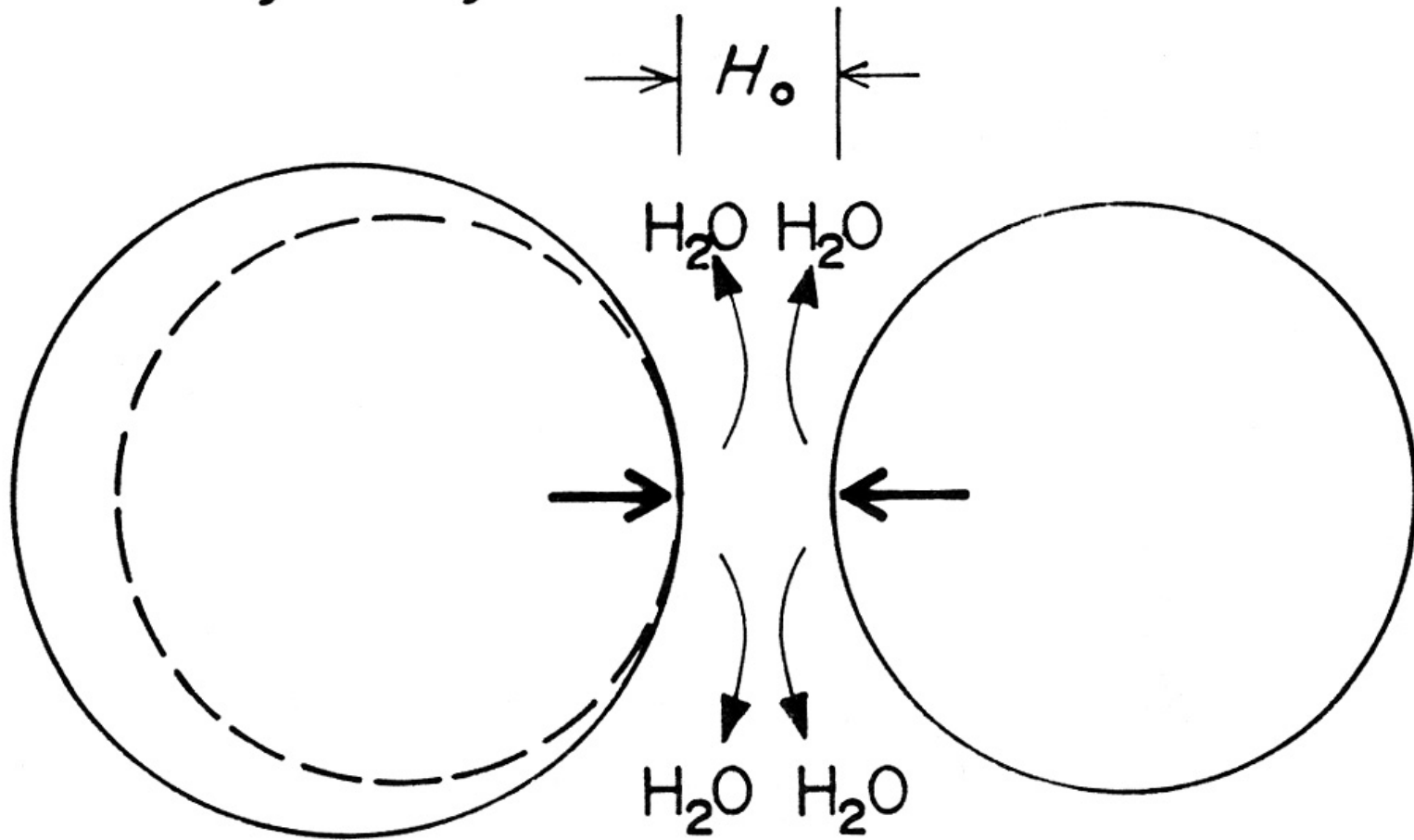
$$\epsilon_r = 78.54$$

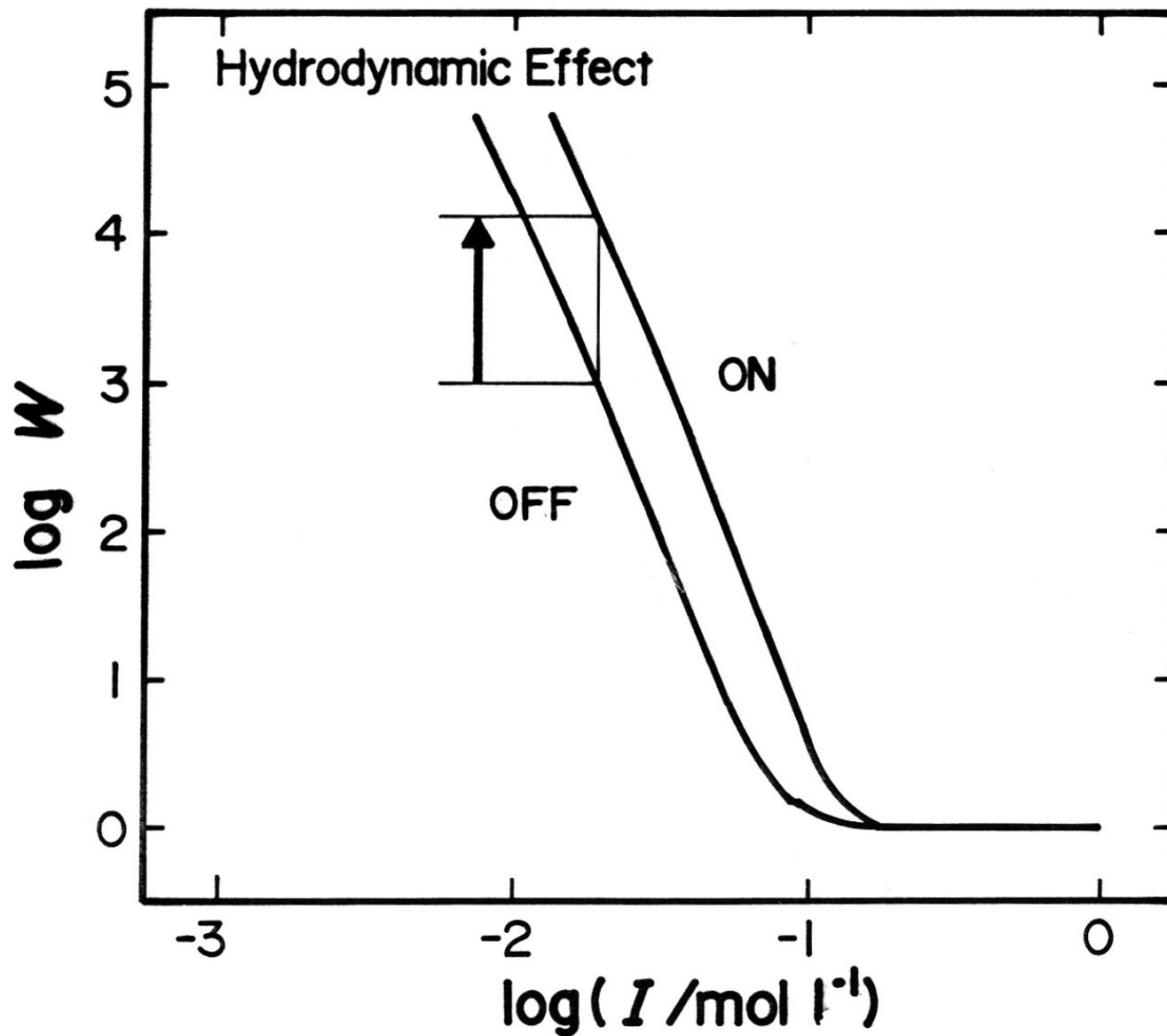
$$A = 1.0 \times 10^{-20} \text{ J}$$

Hydrodynamic Effect

1-1 electrolyte

Hydrodynamic Effect





$\psi_s = 20.54 \text{ mV}$
 $a = 100 \text{ nm}$
 $A = 5.0 \times 10^{-21} \text{ J}$
 $T = 298 \text{ K}$
 $\epsilon_r = 78.54$
 1-1 electrolyte

