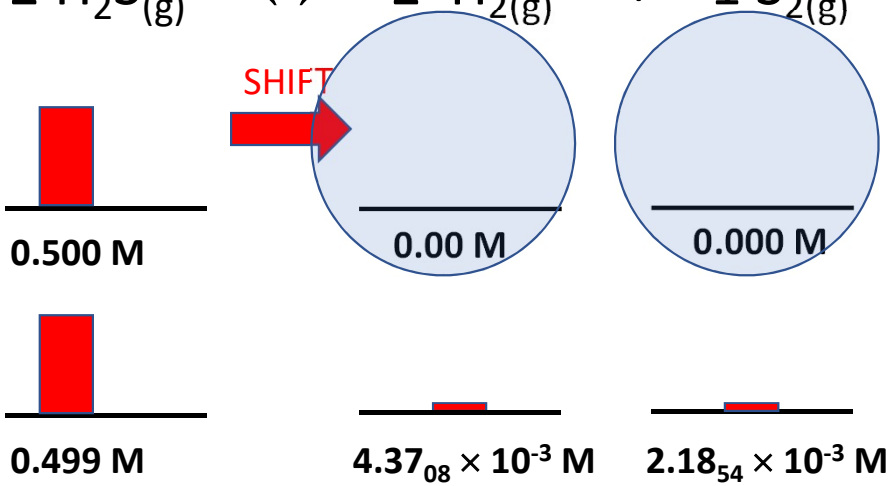
How does an equilibrium reaction shift?

1. Direction: Right (products) or Left (reactants)
2. Degree:
   a. Strongly: Large changes in Product and Reactant amounts
   b. Weakly: Small changes in Product and Reactant amounts

Favors Reactants!

$2\ H_2S_{(g)} \leftrightarrow 2\ H_{2(g)} + 1\ S_{2(g)}$

$K_c = 1.67 \times 10^{-7}$



I

E

Equilibrium Requires non-zero Products and Reactants

Equilibrium must shift in direction of zeros.

Slight shift right required since Kc is very small (favors reactants)

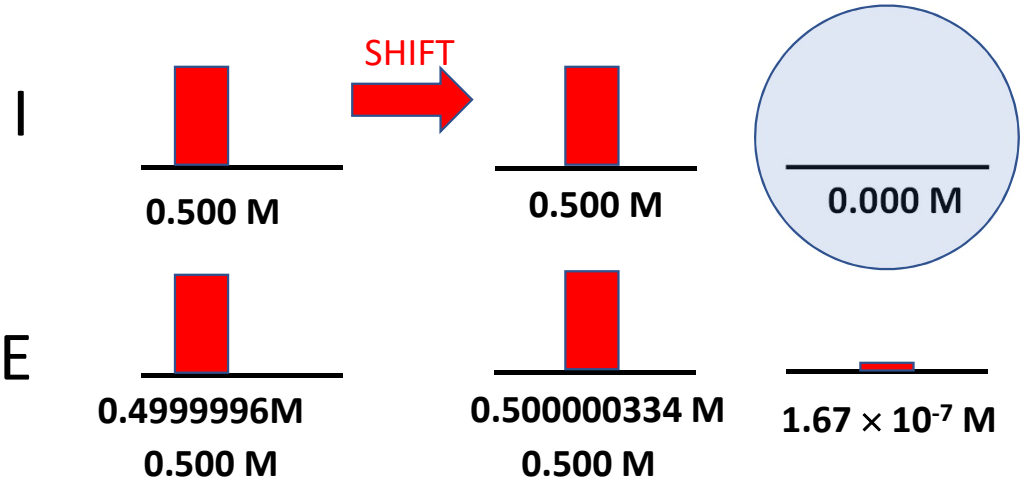
Reaction shifts *slightly* to the right

How does an equilibrium reaction shift?

1. Direction: Right (products) or Left (reactants)
2. Degree:
   a. Strongly: Large changes in Product and Reactant amounts
   b. Weakly: Small changes in Product and Reactant amounts

Favors Reactants!

$2\ H_2S_{(g)} \leftrightarrow 2\ H_{2(g)} + 1\ S_{2(g)}$ $\quad K_c = 1.67 \times 10^{-7}$



Equilibrium Requires non-zero Products and Reactants

Equilibrium must shift in direction of zeros.

Slight shift right required since Kc is very small (favors reactants)

Initially there is significant H_2 initially present

Very slight shift right required

Reaction shifts *very* slightly to the right

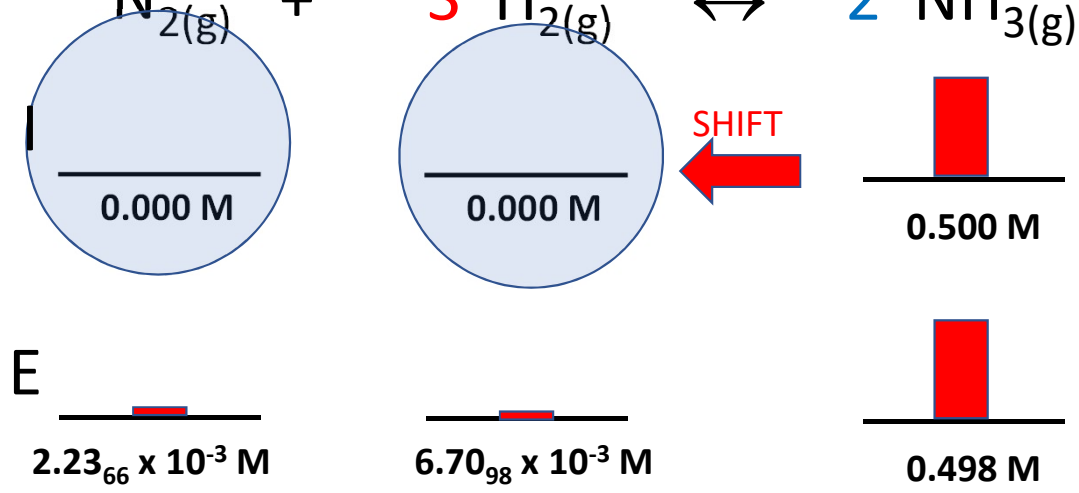
How does an equilibrium reaction shift?

1. Direction: Right (products) or Left (reactants)
2. Degree:
   a. Strongly: Large changes in Product and Reactant amounts
   b. Weakly: Small changes in Product and Reactant amounts

Favors Products!

$N_{2(g)} + 3\ H_{2(g)} \leftrightarrow 2\ NH_{3(g)}$

$K_c = 3.70 \times 10^8$



Equilibrium Requires non-zero Products and Reactants

Equilibrium must shift in direction of zeros.

Slight shift left required since Kc is very large (favors products)

Reaction shifts slightly to the left

How does an equilibrium reaction shift?

1. Direction: Right (products) or Left (reactants)
2. Degree:
   a. Strongly: Large changes in Product and Reactant amounts
   b. Weakly: Small changes in Product and Reactant amounts

Favors Products!

$N_{2(g)} + 3\ H_{2(g)} \leftrightarrow 2\ NH_{3(g)}$

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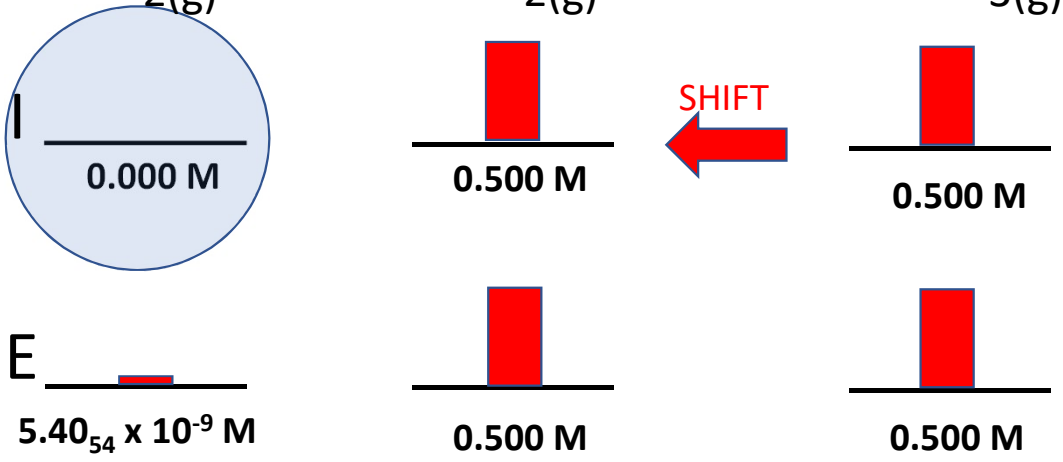


Equilibrium Requires non-zero Products and Reactants

Equilibrium must shift in direction of zeros.

Slight shift left required since K_c is very large (favors products) and H_2 is given a "head start".

Less N_2 will be required at equilibrium.

Reaction shifts *very* slightly to the left

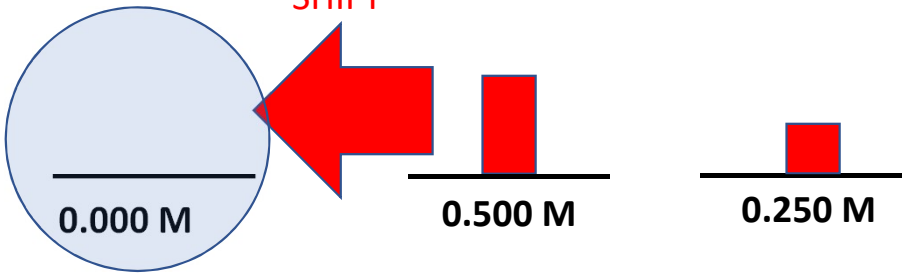
How does an equilibrium reaction shift?

$2\ H_2S_{(g)} \leftrightarrow 2\ H_{2(g)} + 1\ S_{2(g)}$ $K_C = 1.67 \times 10^{-7}$

Favors Reactants!

SHIFT

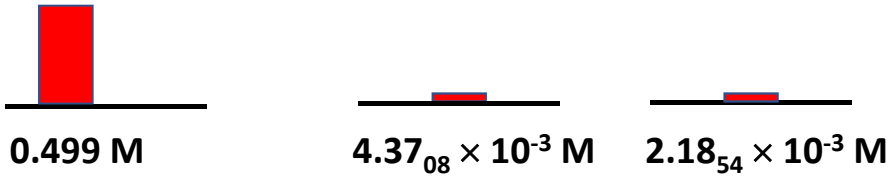
I



Equilibrium Requires non-zero Products and Reactants

Equilibrium must shift in direction of zeros.

E



LARGE SHIFT left required since K_c is very small (favors reactants)

Reaction shifts STRONGLY to the left….

Whenever a strong shift can be predicted

A material shift is recommended before I.C.E.