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7.2 Direction of Reversible Reactions

AP Chemistry

Compare the forward and reverse rates. Forward greater: net forward. Reverse greater: net reverse. Equal: equilibrium.

1. For C ⇌ D, the forward rate is 2.5×10^{-4} M/s and the reverse rate is 8.0×10^{-4} M/s. Which way is the net reaction going? What happens to [C] and [D]?

2. A flask starts with only D. At the start, which rate is larger? Which way does the reaction go?

3. The table shows the rates for A ⇌ B over time.

Time	Forward rate (M/s)	Reverse rate (M/s)
t_0	6.0×10^{-3}	0
t_1	4.1×10^{-3}	1.5×10^{-3}
t_2	3.0×10^{-3}	2.6×10^{-3}
t_3	2.8×10^{-3}	2.8×10^{-3}
t_4	2.8×10^{-3}	2.8×10^{-3}

(a) Which way is the net reaction going between t_0 and t_2?

(b) When is equilibrium reached? How can you tell?

(c) Explain why the forward rate goes down.

(d) Explain why the reverse rate goes up.

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4. Particle counts for A ⇌ B in a closed box: t_1: 10 A, 2 B; t_2: 7 A, 5 B; t_3: 6 A, 6 B; t_4: 6 A, 6 B.

(a) Which rate was greater from t_1 to t_2?

(b) When was equilibrium reached?

(c) At t_4, are A particles still turning into B?

5. A student says the reaction in question 4 "finished" at t_3, because A and B are equal. Explain the two mistakes.

6. Sketch the forward and reverse rates vs time for a reaction that starts with only reactants.

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