Chemical Reactions

Chapter 14 – 3

Types of Chemical Reactions

Essential Questions

- Describe the four types of chemical reactions.
- How are chemical equations classified as one of the types?

Definitions

- Synthesis reaction – reaction in which two or more substances combine to make a new substance
- Decomposition reaction – a compound breaks down to form two or more simpler substances
- Single-displacement reaction – one element or radical takes the place of another element or radical

Definitions, continued

- Double-displacement reaction – ions from two compounds change places

Types of Chemical Reactions

- **Reactions can be in four main categories**
  - **Synthesis**
  - **Decomposition**
  - **Single replacement**
  - **Double replacement**
- **Each will be illustrated with a dance model**

Synthesis Reactions

- **Two or more substances combine to form a new compound**
- Ex: Na + Cl $\longrightarrow$ NaCl
- Dance example: Chandler asks Ashley to dance, they are now one couple dancing

Synthesis Reactions

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Ben Affleck

Jennifer Lopez

Synthesis Reactions

=

Bennifer

Decomposition Reaction

- **reaction where a single compound breaks down into two simpler compounds**
- Ex: $H_2CO_3 \longrightarrow H_20 + CO_2$
- Dance example: John is dancing with Kayla, he leaves to get her a drink. They have gone from a dancing couple to two single people.

Decomposition Reaction

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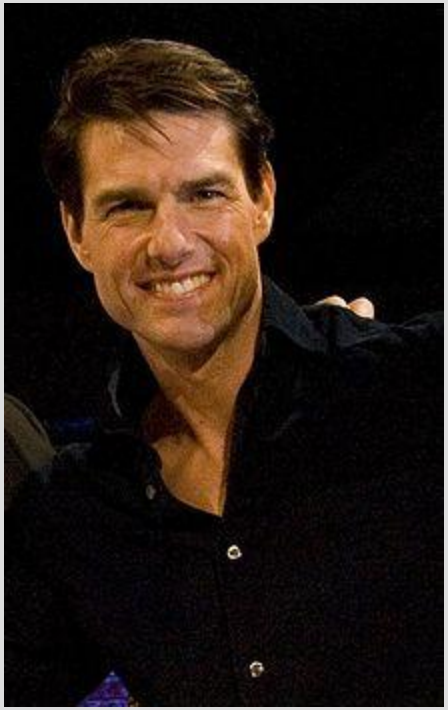
Tom Cruise and Nicole Kidman

Decomposition Reaction



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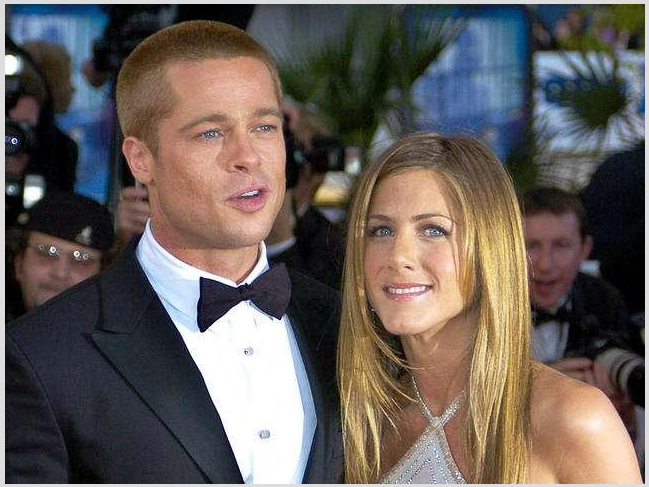
Tom Cruise

Nicole Kidman

Single-Displacement Reaction

- One element replaces another element that is part of a compound
- Ex: $Zn + 2HCl \longrightarrow ZnCl_2 + H_2$
- Dance example: Darrian and Tyler are dancing. Zack cuts in, now Zack and Darrian are dancing and Tyler is alone.

Single-Displacement Reaction



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Brad Pitt and
Jennifer Aniston

Angelina Jolie

Single-Displacement Reaction

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Jennifer Aniston

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Brad Pitt and Angelina Jolie

Reactivity of Elements

- More reactive elements displace less reactive elements in a single-displacement reactions
- Group 1 is the most reactive; Group 17 is the only non-metal group that is reactive

Double-Displacement Reactions

- Ions from two compounds exchange places
- Ex: $NaCl + AgF \longrightarrow NaF + AgCl$
- Dance example: Fidel and Yadira are dancing. German and Crystal are dancing. As they pass each other, they switch partners. Now Fidel and Crystal are dancing and German and Yadira are dancing.

Double-Displacement Reactions

Pauly D & Snooki

+

The Situation &Jwoww

Double-Displacement Reactions

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The Situation & Snooki

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Jwoww & Pauly D