## Defining Chemistry and Balance

solara

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Studying the Transformation of matter (Reaction):

- → through time: chemical kinetics
- → through space: chemical engineering

Using a catalyst to increase the rate of a chemical reaction:

$$A + B \longrightarrow D \quad slow$$
 (1)

$$A + B + \boxed{C} \longrightarrow E \quad fast$$

$$E \longrightarrow D + \boxed{C} \quad fast$$

$$(2)$$

$$(3)$$

$$E \longrightarrow D + \boxed{C} \quad fast \tag{3}$$

A chemical reaction happens between atoms. Chemistry is the preservation of the atom  $\neq$  nuclear physics

$$H_2SO_4 + 2 NaCl \longrightarrow Na_2SO_4 + 2 HCl$$