

# **Strength of the Covalent Bond**

# Bond Dissociation Energy

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The energy required to break a bond



Endothermic for stable compounds :

$\Delta H^\circ$  is always positive ( + )

# Representative BDEs

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Bond	$\Delta H^\circ$ (kJ/mol)
$\text{H}-\text{H} \rightarrow 2\text{H}\cdot$	436
$\text{H}-\text{F} \rightarrow \text{H}\cdot + \text{F}\cdot$	569
$\text{H}-\text{Cl} \rightarrow \text{H}\cdot + \text{Cl}\cdot$	432
$\text{H}-\text{Br} \rightarrow \text{H}\cdot + \text{Br}\cdot$	366
$\text{H}-\text{I} \rightarrow \text{H}\cdot + \text{I}\cdot$	298

# Use of Bond Energies in

Thermochemistry (The heat energy released or absorbed)

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Bond-dissociation energies can be used to calculate  $\Delta H^\circ_{\text{reaction}}$



## Example: Using BDEs

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break bonds

make bonds



349

495

380

431

846

811

$$\Delta H^\circ = \Delta(\text{BDEs broken}) - \Delta(\text{BDEs formed})$$

$$\Delta H^\circ = 846 - 811 = +35\text{kJ}$$

# Hess's Law, BDEs, and $\Delta H^\circ$

