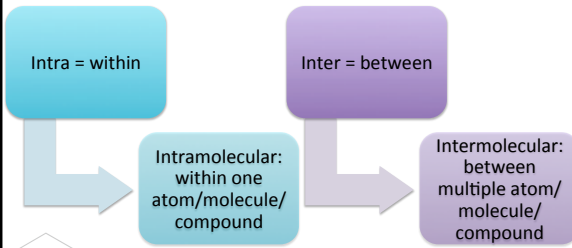


Intermolecular Bonding

Presented by
Amelia McCutcheon

the zen of chemistry
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Intramolecular & intermolecular forces




Intra = within

Inter = between

Intramolecular: within one atom/molecule/compound

Intermolecular: between multiple atom/molecule/compound





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Dipole-dipole forces

- Di = two
- Polar = opposites

Think Magnets!





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Dipole-dipole forces

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Think Magnets!





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4

Dipole-dipole forces

- Di = two
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Think Magnets!





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5

Dipole-dipole forces

- Di = two
- Polar = opposites

Think Magnets!



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Dipole-dipole forces

- In the context of molecules, we are talking about positive and negative ends of a POLAR molecule
- Electronegativity and asymmetry within a molecule causes a **permanent** dipole



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Ion-dipole Forces

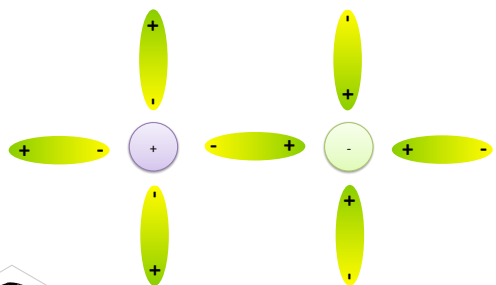
- Dipole in molecular compound is attracted to cations and anions in solution
- Negative (-) end of dipole is attracted to cations
- Positive (+) end of dipole is attracted to anions



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Ion-dipole Forces

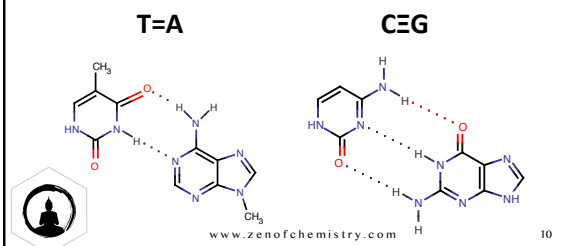


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Hydrogen Bonding

- Strongest type of intermolecular bonding
- H bonded to N, O or F



Dispersion Forces

- Also named van der Waals forces
- Weakest of the intermolecular forces
- Based on the idea that all atoms, ions, molecules and compounds have an **instantaneous dipole**
- In **ALL** atoms, ions, molecules and compounds



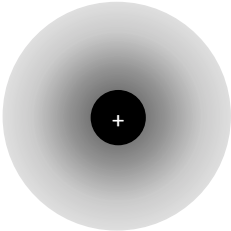
Dispersion Forces


- e.g. Helium atom



Dispersion Forces

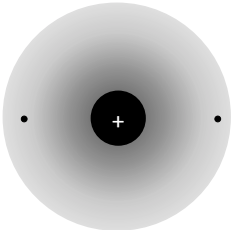
- e.g. Helium atom -




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Dispersion Forces

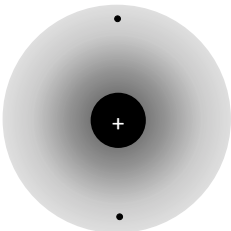
- e.g. Helium atom -




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Dispersion Forces

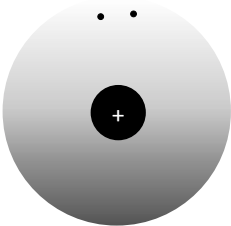
- e.g. Helium atom -



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Dispersion Forces

- e.g. Helium atom -

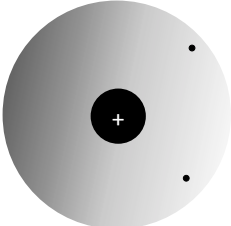


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The diagram shows a central black circle with a white plus sign (+) representing the nucleus. It is surrounded by a larger, light-to-dark grey gradient sphere representing the electron cloud. Two small black dots representing electrons are positioned at the top of the sphere.

Dispersion Forces

- e.g. Helium atom -

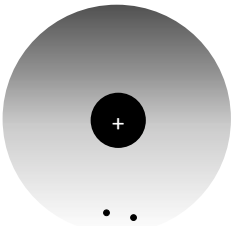


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The diagram shows a central black circle with a white plus sign (+) representing the nucleus. It is surrounded by a larger, light-to-dark grey gradient sphere representing the electron cloud. Two small black dots representing electrons are positioned on the right side of the sphere.

Dispersion Forces

- e.g. Helium atom -



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The diagram shows a central black circle with a white plus sign (+) representing the nucleus. It is surrounded by a larger, light-to-dark grey gradient sphere representing the electron cloud. Two small black dots representing electrons are positioned at the bottom of the sphere.

Dispersion Forces

- e.g. Helium atom -

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Dispersion Forces


- e.g. Helium atom -

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Intermolecular forces

Dipole-dipole Forces	Ion-Dipole Forces	Hydrogen bonding	Dispersion forces
<ul style="list-style-type: none"> Electronegativity and asymmetry within a molecule causes a permanent dipole Positive (+) end of one molecule is electrostatically attracted to the negative (-) end of another 	<ul style="list-style-type: none"> Dipole in molecular compound is attracted to cations and anions in solution Negative (-) end of dipole is attracted to cations Positive (+) end of dipole is attracted to anions 	<ul style="list-style-type: none"> Interaction specifically between H and N, O or F (denoted by - - - - -) Electronegative part of molecule containing N, O or F creates a hydrogen "bond" with a hydrogen in another molecule nearby Strongest of all intermolecular forces 	<ul style="list-style-type: none"> also known as van der Waals forces Instantaneous dipole Weakest of all intermolecular forces but present in all atoms, molecules and compounds

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Intermolecular
Bonding

Presented by
Amelia McCutcheon
