14. **Lattice Energy**: Heat evolved when 1 mole of pure solid is formed from its constituent gaseous ions.

15. \[ \text{LE} = \Delta H_{\text{hyd}} - \Delta H_{\text{sol}} \]

16. \[ \Delta H_f^\circ = \sum n \Delta H_c^\circ \text{ (reactants)} - \sum m \Delta H_c^\circ \text{ (products)} \]

17. \[ \Delta H_f^\circ = \sum m \Delta H_f^\circ \text{ (products)} - \sum n \Delta H_f^\circ \text{ (reactants)} \]

18. **Bond dissociation energy**: The energy required to break 1 mole of a specified covalent bond in a specified compound in the gaseous state.

19. **Bond energy**: Average energy required to break 1 mole of covalent bond in the gaseous state.

20. **Factors affecting bond energy**:
   a. Bond order
   b. Effectiveness of bond overlap
   c. Bond polarity

21. **1st Electron Affinity**: The enthalpy change when 1 mole of electrons is added to 1 mole of gaseous atoms to form 1 mole of singly charged gaseous anions.

22. **Bond Haber Cycle**: An extension of Hess’s Law to ionic compounds. It can be used to determine the LE of ionic compounds.

23. **Entropy**: S is a thermodynamic quantity related to the number of ways the energy of a system can be dispersed through the motions of its particles.

24. **2nd Law of Thermodynamics**: The total entropy of the universe always tends to increase.

25. \[ \Delta S > 0 \]: greater disorder/more no. of ways energy can be dispersed in a system.

26. \[ \Delta S < 0 \]: more ordered state/less no. of ways energy can be dispersed in a system.

27. **Factors affecting entropy of a system**:
   a. Change in temperature
   b. Change in phase
   c. Mixing of particles
   d. Expansion of a gas
   e. Change in number of particles
   f. Dissolution of an ionic solution

28. **Gibbs free energy**: \[ \Delta G = \Delta H - T \Delta S \]

29. \[ \Delta G < 0 \]: Reaction is feasible and can take place spontaneously (reaction is *exergonic*).

30. \[ \Delta G = 0 \]: Reaction is at equilibrium. There is no net change (during melting and boiling).

31. \[ \Delta G > 0 \]: Reaction is not feasible and cannot take place spontaneously (reaction is *endergonic*, and spontaneous if in reverse direction).

<table>
<thead>
<tr>
<th>[ \Delta H &lt; 0 ]</th>
<th>[ \Delta S &lt; 0 ]</th>
<th>[ \Delta S &gt; 0 ]</th>
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</thead>
<tbody>
<tr>
<td>Feasible at low temperatures</td>
<td>Feasible at all temperatures</td>
<td></td>
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