| Chemical Reactions  | Nuclear Reactions                                   |
|---|---|
| Occur when bonds are  | Occur when nuclei emit                              |
| broken  | particles and/or rays                               |
| Atoms remain unchanged,<br>although they may be<br>rearranged | Atoms often converted into atoms of another element |
| Involve only valence  | May involve protons,                                |
| electrons   | neutrons, and electrons                             |
| Associated with small   | Associated with large energy                        |
| energy changes  | changes   |
| Reaction rate influenced by                                   | Reaction rate is not influenced                     |
| temperature, particle size,                                   | by temperature, particle size,                      |
| concentration, etc.   | concentration, etc.                                 |

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| rearranged                  |                                 |
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| Associated with small       | Associated with large energy    |
| energy changes              | changes                         |
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