
Birth of the Elements

1. Explain why there were no helium nuclei in the universe until the temperature cooled to about 10^9 K.
2. Why did the average temperature of the universe need to cool to 3000 K before any chemical reactions could take place?
3. How does kinetic energy increase within a giant molecular cloud (GMC)? What requirement must be met before nuclear synthesis can begin?
4. Explain why the conversion of hydrogen nuclei to helium nuclei releases so much energy.
5. Many of the heavier elements are produced by fusion. Explain why elements with nuclei heavier than iron are not produced this way. How do elements that are heavier than iron form?
6. Carl Sagan once stated "In exploring space, we better understand Earth." What do you think the author meant?

Questions for **The Nature of Things: Attempts to change the periodic table raise eyebrows**

- 1) How did Railsback organize his periodic table?
- 2) How many different groups did he divide his periodic table into? What are they?
- 3) Who else would be interested in Railsback's periodic table? Why?
- 4) What other periodic table shapes have been proposed?
- 5) Who devised the first periodic table?
- 6) How did he organize his periodic table?
- 7) How is the modern periodic table organized?
- 8) What was the last major change to the periodic table?
- 9) Why do chemists want to move helium to be with the Alkali Earth Metals?
- 10) Describe what is meant by "the Tyranny of the Chemist"?