

Challenge Problems on Periodic Properties¹:

The Star Trek Spaceship Voyager accidentally encounters a Gamma Quadrant that traps them in a universe with quite different physical laws from those with which we are familiar. Investigating the chemical elements in the alternative universe, the astronauts discover these properties:

Symbol	Atomic Weight	State	Electrical Conductivity	Reactivity
Bh	1.42	Gas	Very low	Very low
Ik	4.82	Diatomic gas	Very low	Very high
Uc	6.14	Hard, brittle solid	Very low	Medium low
Dt	8.28	Hard, high melting solid	Very high	High
Bc	11.13	Soft, low-melting solid	High	Very high
Ai	13.90	Gas	Very low	Very low
Ye	15.23	Diatomic, volatile* liquid	Very low	Very high
Sk	16.89	Hard, brittle solid	Semiconductor	Medium
On	20.33	Soft, low-melting solid	High	Very high
Zw	28.11	Diatomic, volatile solid	Very low	Very high
Dr	30.27	Hard, brittle solid	Semiconductor	Medium
Fq	32.45	Hard, high-melting solid	Very high	High
Fn	35.74	Soft, low-melting solid	High	Very high

- Arrange these elements into a periodic table. *Note: All elements in the first row have been identified. All periods, if complete, would contain the same number of elements.* **10 points**
- If a new element, E, with atomic weight 23.1, were discovered, what would its properties be? **5 points**
- Are there any other elements that have not yet been discovered? If so, what would their properties be? **5 points**

Only complete and quality work may be submitted for extra credit!

¹<http://jchemed.chem.wisc.edu/JCEW/W/W/Features/CQandChP/LibraryChP/PeriodicPropertiesChP.html>