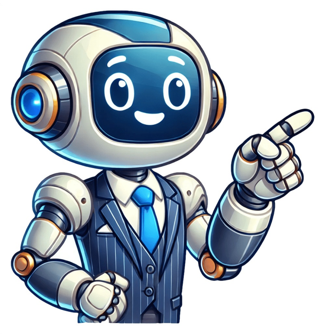

###Understanding Oxidation States and Valence in Mercury** The world of chemistry can be complex, but understanding oxidation states and valence helps us grasp how atoms interact with each other in compounds. At its core, an atom's behavior when part of a molecule is determined by the number of electrons it transfers (oxidizes) or receives (reduces). For mercury, being the 80th element on the periodic table and located in the sixth period, we see its atomic configuration laid out clearly: Hg follows the pattern: 1s^2 2s^2 2p^6 3s^2 3p^6 4s^2 3d^10 4p^6 5s^2 4d^10 5p^6 6s^2 4f^14 5d^10 This means mercury has a total of 80 electrons in its atomic structure. In terms of electronic configuration, the process is as follows: filling shells with electrons starts from 1s → 2s → 2p → 3s → 3p → 4s → 3d → 4p → 5s → 4d → 5p → 6s → 4f → 5d → 6p → 7s → 5f → 6d → 7p. For mercury, this process results in having up to 2 electrons on 's' levels, 6 electrons on 'p' levels, up to 10 electrons on 'd' levels and up to 14 electrons on 'f' levels. Thus, mercury ends up with 80 electrons. In compounds, the oxidation state of Mercury can vary from +1 or +2. The oxidation state is essentially the charge an atom would have if it were a free ion. For mercury, in general its most stable oxidation states are +1 or +2 because these reflect how electrons are transferred during bonding. To break it down further: atoms that act as electron donors (like metals) usually display a positive oxidation state; those that accept electrons typically show a negative oxidation state. In the case of mercury, forming bonds involves sharing electrons between atoms. If more electrons are shared, the atom's overall charge increases and is considered negative in its oxidation state. Conversely, if fewer electrons are shared, it decreases and becomes positive. Understanding these principles can help you grasp how atoms interact with each other when they form compounds, a fundamental concept in chemistry. For centuries, the elusive metal has been shrouded in mystery, its properties and uses coveted by those who seek to harness its power. ### A METAL LIKE NO OTHER Mercury drops at extremely low temperatures, with a freezing point of -38.83°C and a melting point of 234.32 K. Geber, a Persian alchemist born in the 6th Century AD, systemized alchemy and introduced experimental methods to study mercury. He believed that all metals were composed of mercury mixed with sulfur in varying proportions and purities. According to Geber, when these elements are perfectly pure and mixed in perfect proportions, they would form gold. The discovery of mercury dates back to ancient times, with evidence suggesting it was known to the Chinese, Egyptians, and Hindus. Aristotle referred to mercury as 'hydro-argyros' or liquid-silver in his writings around 400 BC. The Romans later modified this term to Hydragyrum, which is now the chemical symbol for mercury. Alchemists revered mercury due to its fluidity and perceived connection to solid and liquid, earth and heaven, life and death. They believed it held the key to transforming base metals into gold and possessed the quintessential property of fluidity. In 1759, Adam Braun and Mikhail Lomonosov isolated solid mercury by freezing a thermometer in a mixture of snow and concentrated nitric acid. This discovery provided strong evidence that mercury shared properties with other metals. Mercury oxide was later heated to yield a gas that accelerated candle burning fivefold, leading to the discovery of oxygen. English chemist Humphry Davy used mercury in various experiments, including isolating calcium for the first time. Mercury in Traditional Chinese Medicine: A Review of Risks and History, including its mentions in Francis Preston Venable's book "A Short History of Chemistry" (2009) and Eric J. Holmyard's book "Makers of Chemistry" (1931).