

Brigitte Van Tiggelen (Science History Institute) and

Annette Lykknes (NTNU – Norwegian University of Science and Technology)

A tale of resilience: the periodic system after radioactivity and the discovery of the neutron

Presented in 1869, the Periodic System is still an icon in contemporary science, even though the understanding of elements and chemical reactions has tremendously evolved over the last 150 years. The resilience of the periodic system to conceptual changes is remarkable, and the fine structure of how this frame of reference was perpetually renegotiated and stabilized by the scientific community is often explained as a result of the underlying atomic structure. But how did the actors navigate these times of reinterpretation? And what hidden meanings and values of the Periodic System were displayed through this process? The physicist Lise Meitner and the chemist Ida Noddack-Tacke were, in different ways, involved in discoveries and interpretations of the Periodic System. In 1934, both of them published an article on the system; Meitner in *Die Naturwissenschaften* – Noddack-Tacke in *Angewandte Chemie*. These two articles, written from the perspectives of a nuclear physicist and a chemist experienced in searching for undiscovered elements, respectively, constitute excellent sources for understanding what the new discoveries and insights meant for the meaning and value of the Periodic System at the very beginning of the nuclear age in science – from the perspective of the nucleus and mass-energy relations and of the existence and identification of possibly numerous chemical elements.