

The second assumption concerned the periodicity of the transuranes. Because the elements Ac, Th, Pa, and U chemically resembled the transition elements in the third row of the periodic table, La, Hf, Ta, and W, scientists believed that elements beyond U would correspondingly resemble those following W. Thus, the transuranes were thought to be homologues of Re, Os, Ir, Pt, and the other transition elements in the third row. This belief was generally unquestioned and seemed to be confirmed. In fact, by 1937 Hahn was sure that the chemical evidence of transuranes confirmed their location in the periodic table.

### Meitner's Exile

By 1938, the political situation in Germany had become dangerous for Meitner. Because she was of Jewish descent, she was targeted by the Nazis and fled to Sweden to escape persecution. Meanwhile in Berlin, Hahn and Strassman, who were critical of the Nazis, had to be careful.

Despite being censored by the Nazis, Meitner's team continued to communicate through letters. Meitner could not formulate a satisfying physical explanation for the chemical results of Hahn and Strassman, and she insisted that her partners reexamine their findings. Because of her colleagues' great respect for her talent and expertise, they quickly performed control experiments to test their results.

### A Shocking Discovery

Prompted by Meitner, Hahn and Strassman realized they had been looking in the wrong place to find the cause of their results. In analyzing a fraction of a solution assay that they had previously ignored, they found the critical evidence they had been seeking.

The analysis indicated that barium appeared to be a result of neutron bombardment of uranium. Suspecting the spectacular truth but lacking confidence, Hahn wrote to Meitner for an explanation. After consultation with her nephew, Otto Frisch, Meitner proposed that the uranium nuclei had been broken apart into elemental fragments, one of which was barium, Ba. On January 3, 1939, she wrote to Hahn to congratulate him on the ground-breaking result.

Thus, the "transuranes" turned out to be merely radioisotopes of known elements—atomic fragments of uranium atoms that had burst apart when struck by neutrons.





▲ The politics of World War II prevented Lise Meitner from receiving the Nobel Prize in physics for explaining nuclear fission.

For the discovery of this unexpected phenomenon, which Meitner named nuclear fission, the talented Hahn was awarded the 1944 Nobel Prize in chemistry. Because of wartime politics, however, Lise Meitner did not receive the corresponding award in physics. She was not properly recognized until well after her death in 1968 for her role in clarifying the process that she first explained and named.

### Questions

1. What type of element did Fermi expect to find when uranium absorbed a neutron and then ejected a beta particle?
2. What were the products of uranium disintegrations?



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