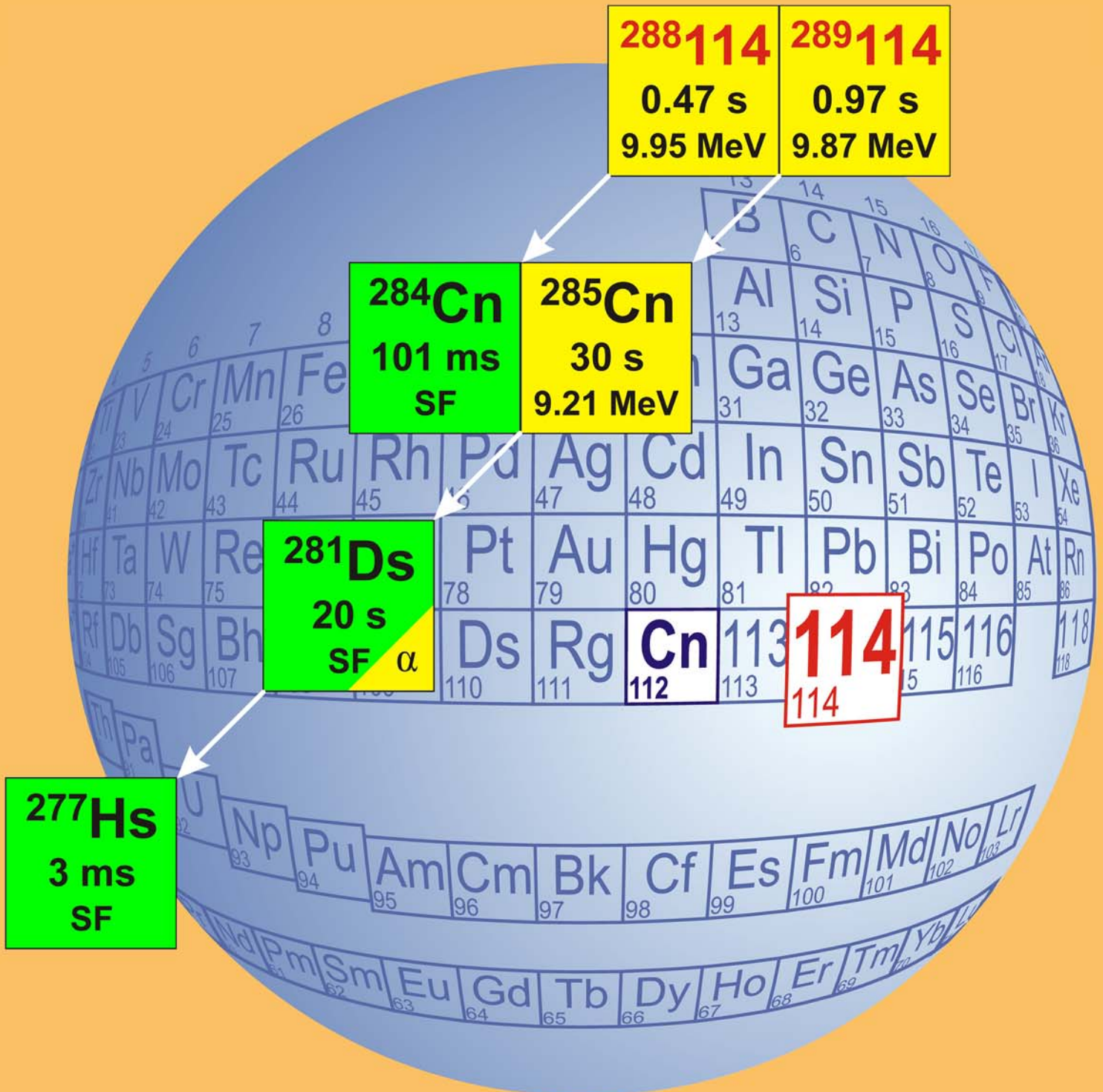


## SCIENTIFIC REPORT 2009



### **Cover Illustration:**

The front cover shows in summary the nuclear decay chains measured in the first element 114 experiment at the GSI Helmholtzzentrum für Schwerionenforschung. This is the heaviest element ever observed at the GSI. A  $^{48}\text{Ca}$  beam from the UNILAC impinging on  $^{244}\text{Pu}$  targets was used for its synthesis. The isotopes  $^{288}114$  and  $^{289}114$  were separated with the highly efficient gas-filled recoil separator TASCA (TransActinide Separator and Chemistry Apparatus), and statistically highly significant data were obtained. A newly developed focal plane detector allowed for the safe identification of the nuclear decays of the element 114 isotopes and their daughter nuclides. A so far unknown  $\alpha$ -decay branch in  $^{281}\text{Ds}$  as well as the new isotope  $^{277}\text{Hs}$ , which exhibits an interestingly short spontaneous fission half-life, were discovered in the course of this experiment, which was performed in the summer of 2009. Relatively high cross sections were measured for the element 114 isotopes, which pave the way for further experiments with this element. The background displays in an artist's view the periodic table. It does not only reflect chemist's main "road map" but it also emphasizes the position of element 114 and alludes to the first element 114 chemistry experiment performed at GSI in the fall of 2009. Element 112, which was discovered several years ago by the SHIP group at GSI, is also highlighted. Most recently, the International Union of Pure and Applied Chemistry accepted the name Copernicium and the chemical symbol Cn for element 112, as proposed by the discovery team.