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Masses of Proton-Rich Nuclides from Nb to Rh and their Influence on the rp- and νp-processes J. FALLIS, Manitoba/ ANL/ TRIUMF, K.S. SHARMA, H. SHARMA, Manitoba, J.A. CLARK, G. SAVARD, A.F. LEVAND, T. SUN, ANL, D. LASCAR, R. SEGEL, Northwestern, S. CALDWELL, J. VAN SCHELT, Chicago, C.M. DEIBEL, C. WREDE, Yale, N.D. SCIELZO, LLNL, A.A. HECHT, Maryland, A. PARIKH, TUM, F. BUCHINGER, J.E. CRAWFORD, S. GULICK, J.K.P. LEE, G. LI, McGill — The reaction paths of two astrophysical processes on the proton-rich side of stability, the rp and νp processes, pass through isotopes of Mo, Tc, Ru and Rh whose masses have only recently been measured. These measurements provide the more precise proton-separation energies,S_p, needed to model the paths and final abundances of these two processes. These S_p have been of particular interest to the νp process as it is a process which could potentially resolve the long-standing underproduction of light p-nuclei such as ^{92}Mo and ^{94}Mo. Accordingly, mass measurements of 18 proton-rich nuclides of elements from Nb to Rh have been performed with the Canadian Penning trap mass spectrometer, reducing uncertainties in the associated S_p values by up to factors of 60 compared to the 2003 Atomic Mass Evaluation. ^{87}Mo is found to disagree with the evaluated mass by 3.7σ, which affects recent νp-process abundance calculations. This work has been supported by grants from NSERC, Canada and by the U.S. DOE (DE-AC02-06CH11357 and DE-FG02-91ER-40609).

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