Erratum: High-Precision Mass Measurement of ^{56}Cu and the Redirection of the *rp*-Process Flow [Phys. Rev. Lett. 120, 032701 (2018)]

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In the Letter, we presented a new ^{55}Ni$(p,\gamma)^{56}$Cu reaction rate based on our measured ^{56}Cu mass and the resonance information taken from [1]. The rate reported in the Letter is incorrect due to an incorrect scaling of the penetrability factor

TABLE I. The recommended reaction rate $N_A\langle\sigma v\rangle$ as a function of temperature T (GK) from this work, together with 1-σ uncertainties (higher and lower).

	$N_A\langle\sigma v\rangle$ (cm^3/s/mole)		
T_9	Recommended	Lower	Upper
0.100	4.487e − 19	4.158e − 19	4.612e − 19
0.200	5.301e − 12	4.107e − 12	8.781e − 12
0.300	2.199e − 08	1.742e − 08	2.894e − 08
0.400	1.743e − 06	1.120e − 06	2.621e − 06
0.500	2.931e − 05	1.841e − 05	4.950e − 05
0.600	2.141e − 04	1.262e − 04	4.048e − 04
0.700	9.195e − 04	5.080e − 04	1.906e − 03
0.800	2.795e − 03	1.450e − 03	6.198e − 03
0.900	6.767e − 03	3.292e − 03	1.563e − 02
1.000	1.403e − 02	6.428e − 03	3.295e − 02
1.500	1.731e − 01	7.422e − 02	3.388e − 01
2.000	8.899e − 01	4.791e − 01	1.450e + 00
3.000	6.682e + 00	4.962e + 00	9.097e + 00
3.500	1.336e + 01	1.073e + 01	1.695e + 01
4.000	2.402e + 01	2.046e + 01	2.874e + 01
4.500	4.058e + 01	3.615e + 01	4.627e + 01
5.000	6.590e + 01	6.074e + 01	7.238e + 01
6.000	1.604e + 02	1.541e + 02	1.679e + 02
7.000	3.554e + 02	3.486e + 02	3.634e + 02
8.000	7.193e + 02	7.122e + 02	7.273e + 02
9.000	1.338e + 03	1.331e + 03	1.346e + 03
10.000	2.313e + 03	2.306e + 03	2.321e + 03

TABLE II. REACLIB fit coefficients for our corrected ^{55}Ni(p,γ) reaction rate, with the fit performed over the temperature range of 0.1 to 10 GK.

a_0	a_1	a_2	a_3	a_4	a_5	a_6
3.046255E + 00	−7.508431E + 00	2.049851E + 00	−2.648531E + 00	1.357497E − 01	−7.098837E − 03	−1.061167E − 01
−7.516925E + 01	−9.131942E + 00	5.982367E + 01	2.418860E + 01	−5.181901E + 00	3.801069E − 01	1.526078E + 01
−1.968345E + 00	−5.296513E + 00	−3.830019E − 04	5.743085E − 04	−3.599905E − 05	2.300254E − 06	−1.500277E + 00
−1.718560E + 01	−2.858869E + 00	8.588120E − 01	−1.036879E + 00	5.156693E − 02	−2.666759E − 03	−9.389072E − 01
2.730636E + 01	4.610386E − 06	−3.894134E + 01	1.459666E − 04	−6.651521E − 06	2.754834E − 07	−6.667493E − 01

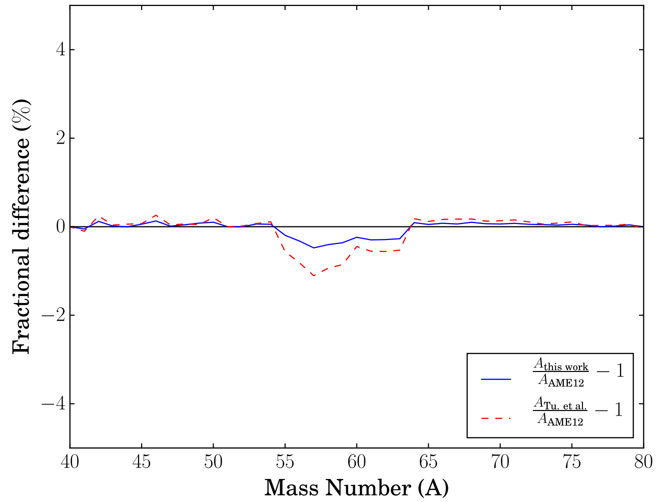

FIG. 1. Fractional difference of abundance by mass number using the mass of ^{56}Cu measured in this work (solid blue line), and [3] (dashed red line), compared to that using the mass suggested in AME2012 [5].

in the proton widths. In this Erratum, we report an updated rate along with recommended REACLIB parameters, and we reevaluate the change in the mass distribution of rp-process ashes.

The corrected rate for the 579.8 keV Q value reported in the Letter is given in Table I, with the REACLIB parameters given in Table II. The change in the mass distribution of the rp-process ashes (similar to Fig. 5 in the Letter) is shown in Fig. 1. The recalculated ash composition, using a single zone model, for a typical x-ray burst trajectory [2] shows a less dramatic effect on the ashes using both the mass reported in this work as well as the mass reported in [3] (which was also incorrectly scaled in the Letter). We would like to stress, however, that these calculations assume a large β-delayed proton emission branch of 78% for ^{57}Zn from [4], which would return most of the bypassed flow back into the ^{56}Ni waiting point. With the mass measurement of ^{56}Cu reported in this Letter significantly constraining the Q value of the first reaction in the bypass sequence ^{55}Ni$(p,\gamma)^{56}$Cu, the β-delayed proton emission branch of ^{57}Zn is now the most significant uncertainty to determine if a bypass of the ^{56}Ni rp-process waiting point is strong.

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