New results from the fragment yields analysis in $^{124}Sn+^{112,124}Sn$ at 26*A* MeV reaction

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Ref. [1] describes the analysis we are currently working on. The main purpose is to use a nucleation time moderated statistical equilibrium model that has previously been used to reproduce ternary neutron induced fission isotopic yields [2] to characterize the neck emission in Sn+Sn collisions at 26*A* MeV obtained with the NIMDOR detector array [3]. The model description, experimental procedure and selection can be found in detail in Ref. [1]. Most of the parameters previously derived from the model were in a realistic range for the mid-rapidity source. Several exceptions included time and critical cluster size values that were too high. During the last year we worked on achieving a better fit by improving the normalization and the minimization algorithm. We also tried different sets of initial parameters in order to locate other minima. The fit results for both reactions are presented in Fig. 1 and

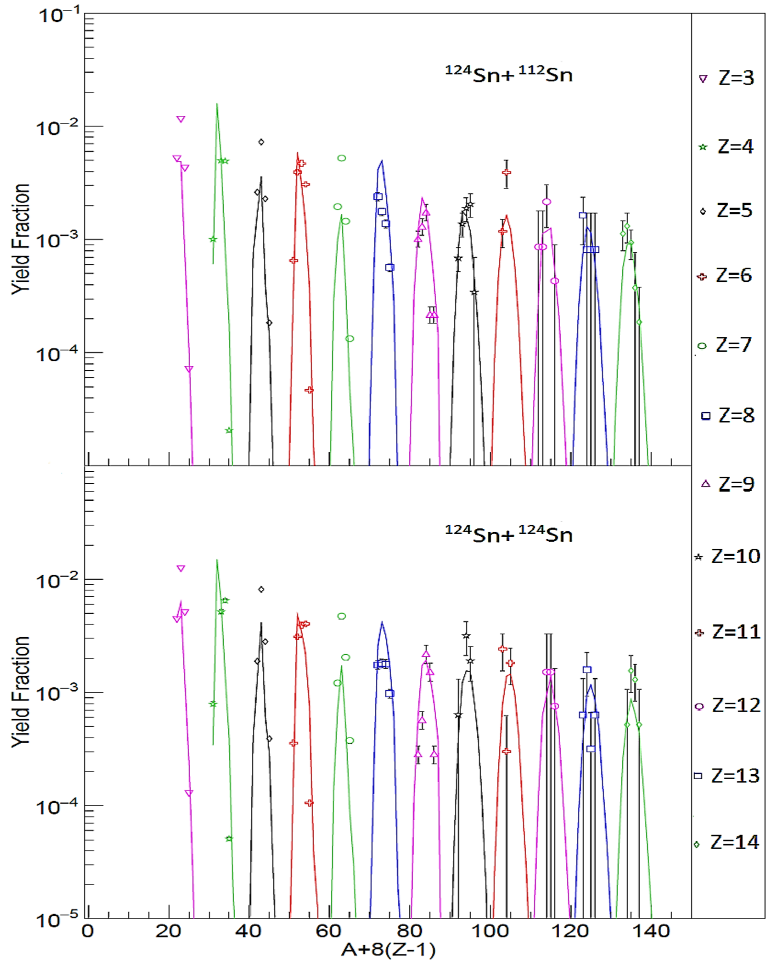

FIG. 1. Corrected yield as a function of N/Z for each isotope and both reactions inside the relative angle selection window.

Table I. The previous parameters and the ones from the induced fission (Ref. [2]) are also shown in Table I.

Table I. Previous and new fit parameter comparison. The neutron induced ^{241}Pu fission parameters are also shown.

System	^{112}Sn target		^{124}Sn target		^{241}Pu
Fit version	old	new	old	new	
Temperature (MeV)	2.76	2.52	2.72	2.43	1.4
Density (10-4 fm-3)	18.67	194	16.38	150	4
Time (fm/c)	6000	600	7300	950	6400
Ac	15.8	6.3	16.1	6.2	5.4
Proton ratio (system)	0.47 (0.42)	0.47 (0.42)	0.44 (0.40)	0.46 (0.40)	0.34 (0.39)
Fit Metric (M^2)	*1.11*	*0.72*	*1.07*	*0.75*	*1.18*

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$$M^2 = \sum_j \{ln[Y_{TF}^{exp}(Z_j, A_j)] - ln[Y_{TF}(Z_j, A_j)]\}^2/n \qquad (1)$$

Another point is the experimental temperature calculation. In the previous report we showed that the temperature estimated using the Albergo calculation with light particles [4] was very similar to the fit parameter (2.7 MeV). The problem is that the source overlap for light particles is significant causing a significant fraction of the yield in in the mid-rapidity source in the fit to be contributions from other sources. To obtain a better estimate we can use IMF isotopic ratios to calculate the Albergo temperature [5]. Since we have good statistics for $^{11,12}C$ isotopes, we used these in combination with several other IMFs to calculate an average temperature for our selection window.

Table II shows the ratios we used and the results we obtained. We see that the average temperature value is around 3.5 MeV, which is 40% higher than the new fit value and 30% higher than the light particle Albergo calculation but is still in a realistic range. The improvements described in this report make us confident that we can now publish the results.

Table II. IMF albergo temperature calculation results.

	T_^{112}Sn (MeV)	T_^{124}Sn (MeV)
^{6,7}Li/^{11,12}C	3.57	3.42
^{7,8}Li/^{11,12}C	4.26	3.98
^{8,9}Li/^{11,12}C	2.19	2.2
^{9,10}Be/^{11,12}C	3.96	3.8
^{11,12}B/^{11,12}C	3.94	3.68
^{12,13}B/^{11,12}C	2.72	2.82
^{12,13}C/^{11,12}C	3.76	3.46
^{13,14}C/^{11,12}C	3.94	4.06
^{15,16}N/^{11,12}C	3.98	4.05
^{16,17}O/^{11,12}C	3.62	3.58
^{17,18}O/^{11,12}C	3.55	3.4
mean	**3.59**	**3.49**

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