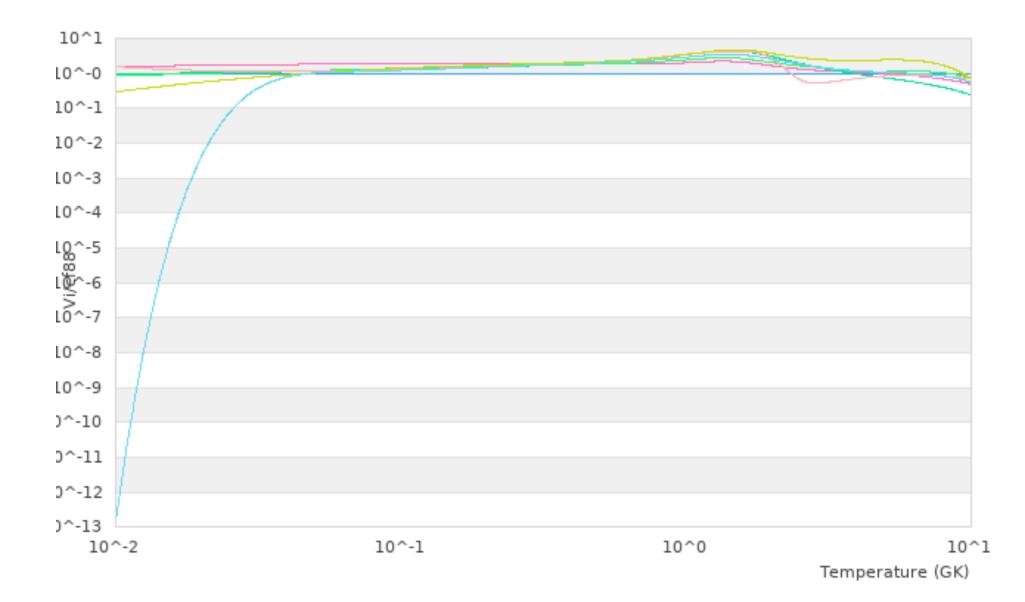
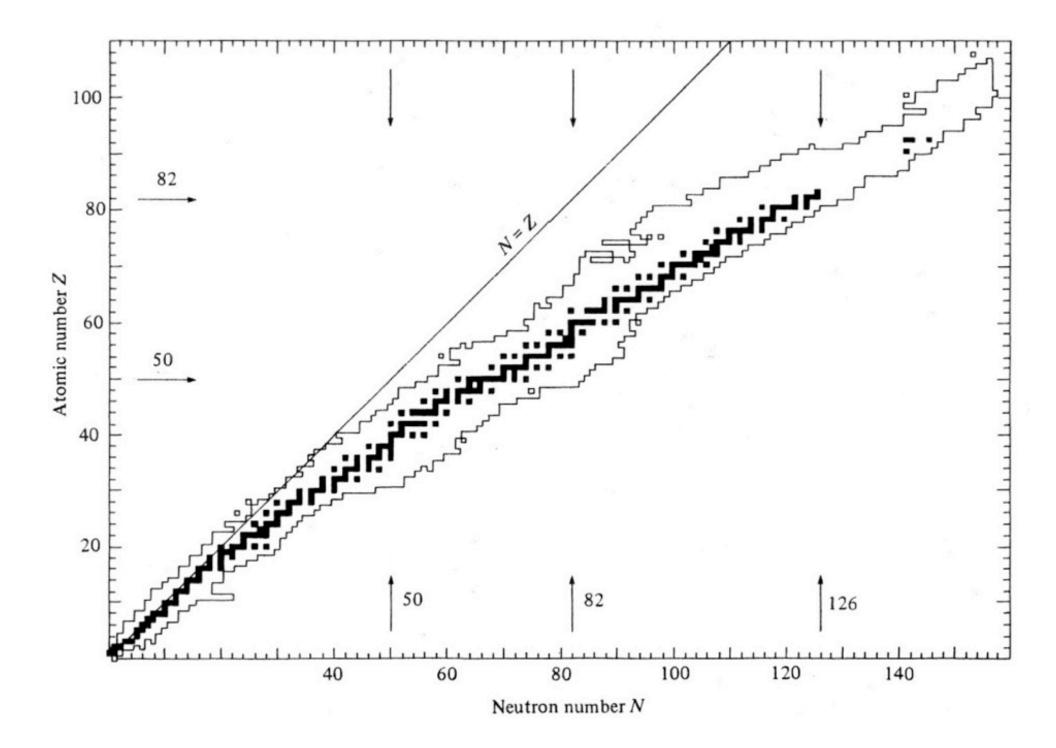
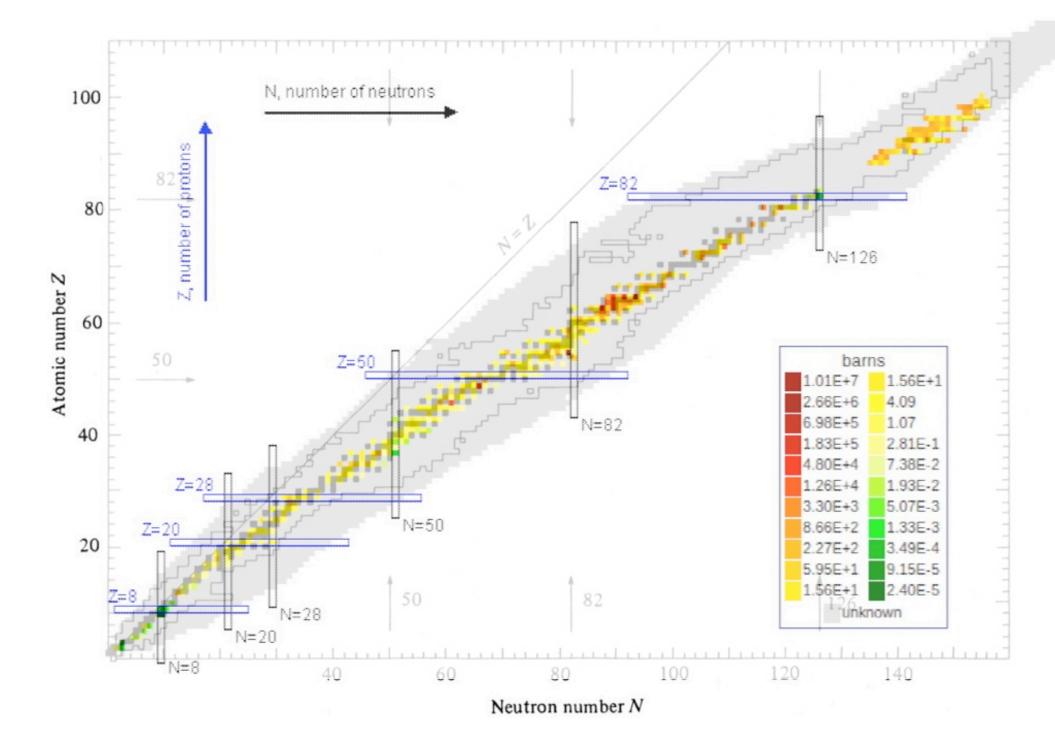


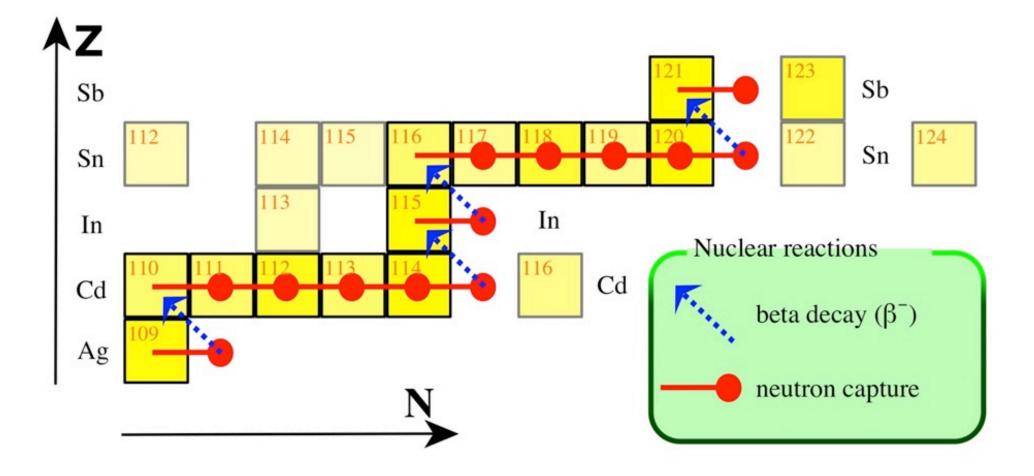
he4 + c12 -> o16 Comparison







Half life Stable Very short) 100,000 yr) 10 yr) 10 days) 10 days) 1 day) 1 day 1 1 day) 1 day 1 1 day 1 1 day 1 1 day 1 1 day 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1															148Sm	¹⁴⁹ Sm	150Sm	151 <u>Sm</u>	152												
) 1 min.										130Pm	131Pm	132Pm	133Pm	134Pm	135Pm	136Pm	137Pm	138Pm	139 <mark>Pm</mark> 1	¹⁴⁰ ₽m	141Pm	142Pa	143Pa	144Pa	145Pm	146Pm	147Pm	148 <mark>Pm</mark>	149Pm1	150Pm	51
127Nd 128Nd									129Nd	130NJ	131Nd	132Nd	133NJ	134 <mark>Nd</mark>	135NJ	13eNG	137 _{Nd}	138[Nd 1	139NG	¹⁴⁰ Nd	141 <mark>N</mark> d	142Nd	143Nd	144Nd	145Nd	146Nd	147Nd	148Nd	149Nd	.50	
			¹²¹ Pr	122Pr	123Pr	124Pr	125Pr	126Pr	¹²⁷ Pr	128Pr	129Pr	¹³⁰ Pr	131Pr	132Pr	133Pr	134Pr	135Pr	136Pr	137Pr 1	138Pr	139Pr	140Pi	141Pr	142Pr	¹⁴³ Pr	144Pr	145Pr	146Pr	147Pr 1	148Pr	.49
				¹²¹ Ce	¹²² Ce	¹²³ Ce	¹²⁴ Ce	¹²⁵ Ce	¹²⁶ Ce	¹²⁷ Ce	¹²⁸ Ce	¹²⁹ Ce	¹³⁰ Ce	¹³¹ Ce	¹³² Ce	¹³³ Ce	¹³⁴ Ce	¹³⁵ Ce	¹³⁶ Ce ¹	137 <mark>Ce</mark>	138 <mark>Ce</mark>	139 <mark>Ce</mark>	¹⁴⁰ Ce	¹⁴¹ Ce	142Ce	143Ce	144Ce	145Ce	¹⁴⁶ Ce ¹	147Ce	148
		¹¹⁸ La	¹¹⁹ La	¹²⁰ La	¹²¹ La	¹²² La	¹²³ La	¹²⁴ La	¹²⁵ La	¹²⁶ La	¹²⁷ La	¹²⁸ La	129La	¹³⁰ La	¹³¹ La	132 <mark>La</mark>	¹³³ La	¹³⁴ La	¹³⁵ La ¹	136La	¹³⁷ La	138La	1 ³⁹ La	¹⁴⁰ La	141La	142La	¹⁴³ La	¹⁴⁴ La	¹⁴⁵ La ⁾	146La	147
115Ba1	16Ba	117Ba	¹¹⁸ Ba	¹¹⁹ Ba	¹²⁰ Ba	¹²¹ Ba	¹²² Ba	123Ba	¹²⁴ Ba	¹²⁵ Ba	¹²⁶ Ba	127 <mark>Ba</mark>	¹²⁸ Ba	¹²⁹ Ba	130 <mark>Ba</mark>	131 <mark>Ba</mark>	¹³² Ba	133 <mark>Ba</mark>	134 <mark>Ba</mark> 1	135 <mark>Ba</mark> i	136 <mark>Ba</mark>	137 <mark>Ba</mark>	138Ba	¹³⁹ Ba	1 ¹⁴⁰ Ba	¹⁴¹Ba	142Ba	¹⁴³ Ba	144Ba1	145Ba	146
114Cs1	15Cs	¹¹⁶ Cs	117Cs	118Cs	119Cs	¹²⁰ Cs	¹²¹ Cs	122 <mark>CS</mark>	123 <mark>05</mark>	¹²⁴ Cs	125(JS	126Cs	¹²⁷ Cs	128Cs	129CS	130CS	¹³¹ Cs	¹³² CS	133Cs 1	¹³⁴ Cs	135 <mark>C.S</mark>	136C.S	¹³⁷ Cs	138Cs	¹³⁹ Cs	140Cs	¹⁴¹ Cs	¹⁴² Cs	143Cs)	144Cs	145
¹¹³ Xe¹	¹⁴Xe	¹¹⁵ Xe	¹¹⁶ ∦e	¹¹⁷ ∦e	¹¹⁸ ∦e	¹¹⁹ Xe	¹²⁰ Xe	¹²¹ Xe	¹²² Xe	¹²³ Xe	¹²⁴ Xe	125Xe	¹²⁶ ∦e	127 <mark>Xe</mark>	¹²⁸ Xe	129 <mark>Xe</mark>	¹³⁰ Xe	131 <mark>8e</mark>	132 <mark>Xe</mark> 1	ызз∦е	134 <mark>%</mark> e	135 <mark>X</mark> 6	¹³⁶ Хе	¹³⁷ Xe	:¹38Xe	¹³⁹ Хе	¹⁴⁰ Xe	¹⁴¹ Xe	¹⁴² Xe ¹	¹⁴³ Xe	144
112]	113 <u>T</u>	114 <u>T</u>	115]	116I	117 <u>T</u>	118 <u>T</u>	119]	120I	121]	122 <u>]</u>	123]	124 <u>]</u>	125]	126 <u>T</u>	127]	128]	129]	130 <mark>1</mark>	131 <u>T</u>	132]	133T	134 <u>T</u>	135Ţ	136]	137I	138I	139I	140T	141I	142]	143
¹¹¹ Te ¹	12Te	¹¹³ Te	¹14Te	115Te	116Te	117Te	¹¹⁸ Te	119 <mark>Te</mark>	¹²⁰ Te	121 Te	¹²² Te	123Te	¹²⁴ Te	125 <mark>]]e</mark>	¹²⁶ Te	127 <mark>Te</mark>	¹²⁸ Te	129 <mark>Te</mark>	¹³⁰ Te ¹	¹³¹ Te	¹³² Te	¹³³ Te	134 <mark>Te</mark>	¹³⁵ Te	¹³⁶ Te	¹³⁷ Te	¹³⁸ Te	¹³⁹ Te	140Te	141Te	142'
110SD1	11SP	112SP	113SP	114SD	115 <mark>SB</mark>	116 <mark>SD</mark>	117 <mark>S</mark> b	118 <mark>55</mark>	119SD	120SP	121SD	122 <mark>SЪ</mark>	123SD	124 <mark>SD</mark>	125SD	126 <mark>5</mark> 5	127SD	128SD	129 <mark>SD</mark> 1	зөSP	131SP	132SE	133SB	134SP	135SD	136SP	137SD	138SP	139SD		
109Sn1	10Sn	111Sn	112Sn	113 <mark>5n</mark>	114Sn	115 <mark>Sn</mark>	116Sn	117 <mark>8n</mark>	118Sn	119 <mark>Sn</mark> e	¹²⁰ Sn	121 <mark>Sn</mark>	¹²² Sn	123 <mark>Sn</mark>	124 <mark>Sn</mark>	125 <mark>Sn</mark>	126Sn	127 <mark>Sn</mark>	128 <mark>Sn</mark> 1	129Sn	130Sn	¹³¹ Sr	1 ³² Sn	1 ¹³³ Sn	1 ¹³⁴ Sn	1 ³⁵ Sn	136Sn	137Sn			
108]n	09 <mark>In</mark>	110In	111In	112In	113In	114 <mark>In</mark>	115 <mark>In</mark>	116In	117 <mark>In</mark>	118 <mark>In</mark>	119In	¹²⁰ In	121 In	122In	123In	¹²⁴ In	125In	126In	127In1	128In	¹²⁹ In	130]r	1 ¹³¹ In	132In	1 ¹³³ In	134In					
107Cd 1	®8Cq.	109Cd	110Cd	111 Cd	112Cd	113 <mark>Cd</mark>	114Cd	115 <mark>Cd</mark>	116Cd	117Cd	118CJ	119Cd	120Cd	121Cd	122Cd	123Cd	124Cd	125Cd	126Cd 1	127Cd	128Cd	12900	[130Cd		1		I				



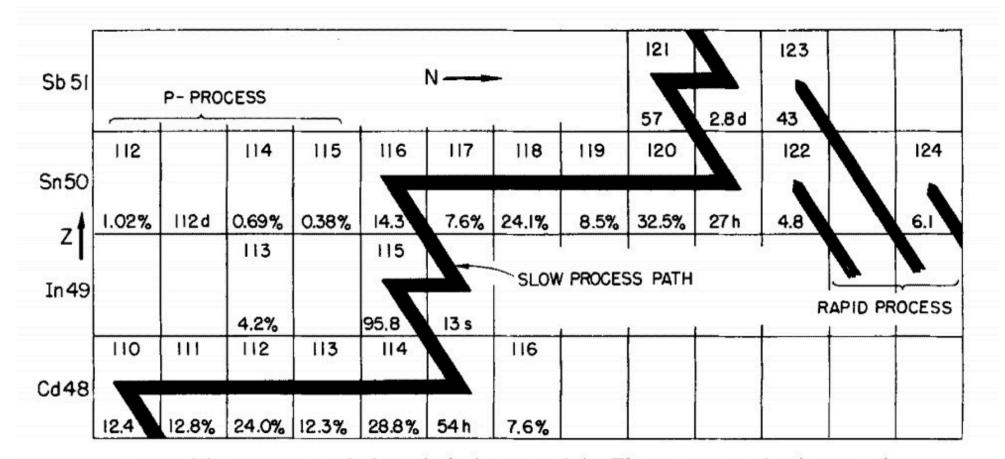
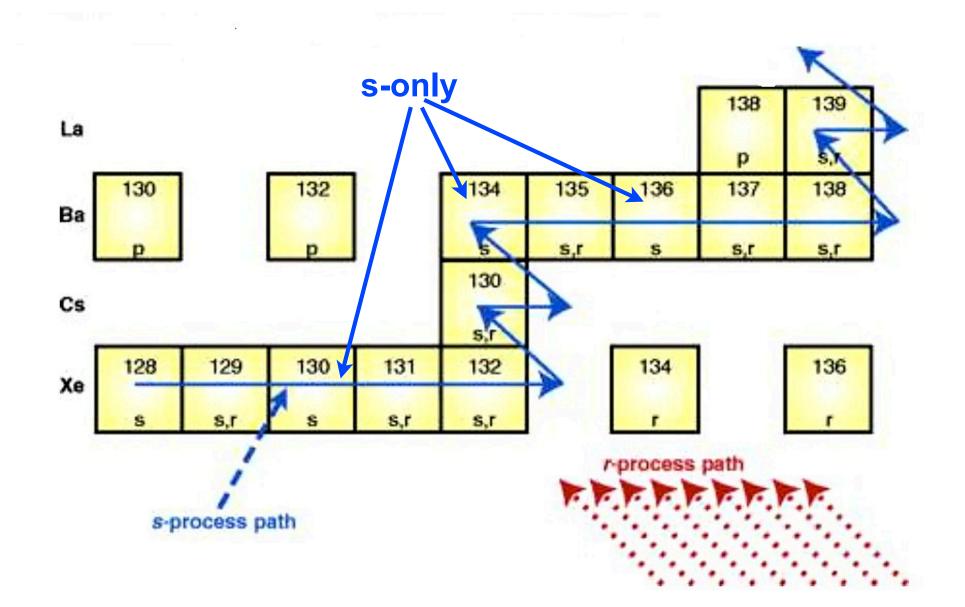
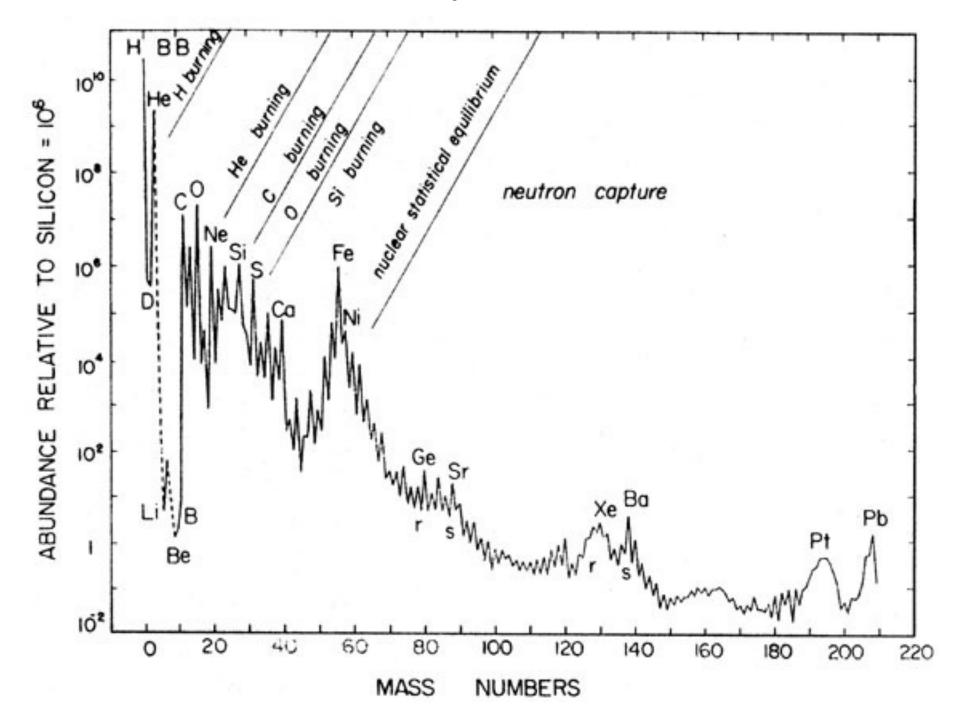


FIG. 4. The s-process path through the isotopes of tin. The neutron number increases by units of one on a slow time scale until negative beta activity occurs and the path moves to the isobar of higher Z. This path can be determined from empirical evidence on the beta stability of nuclei. Note that the path bypasses the p-process and the r-process nuclei. The r-process nuclei are the end products of an isobaric beta-decay chain as shown at the far right from neutron-rich progenitors produced in an intense neutron flux. The p-process nuclei are produced by subjecting a small fraction of s and r-process nuclei to an intense proton or photon flux.

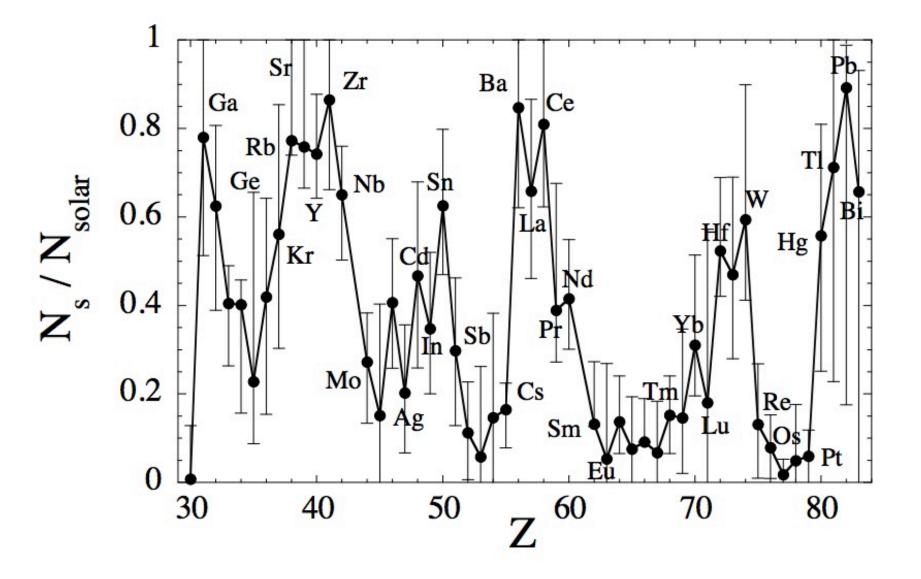
340



overall solar system abundances

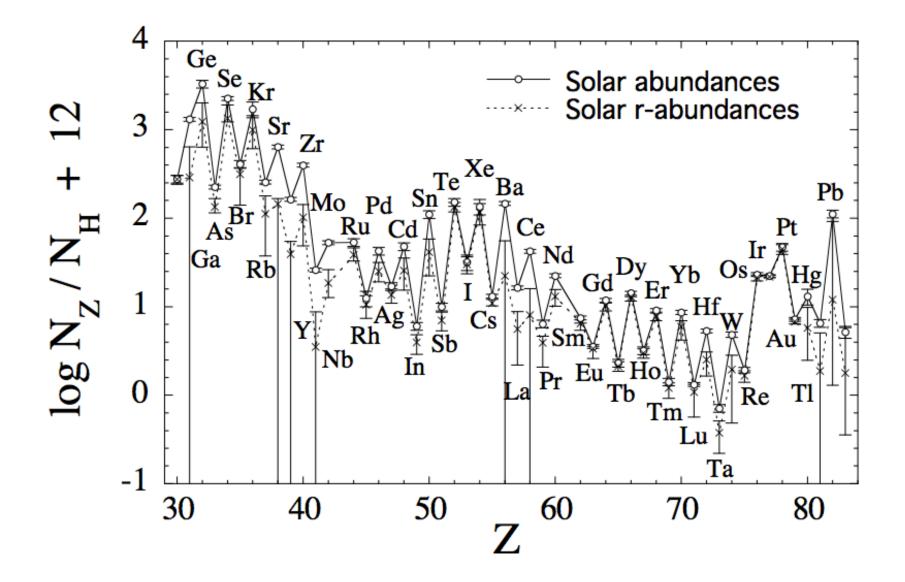


solar system - s process (model)

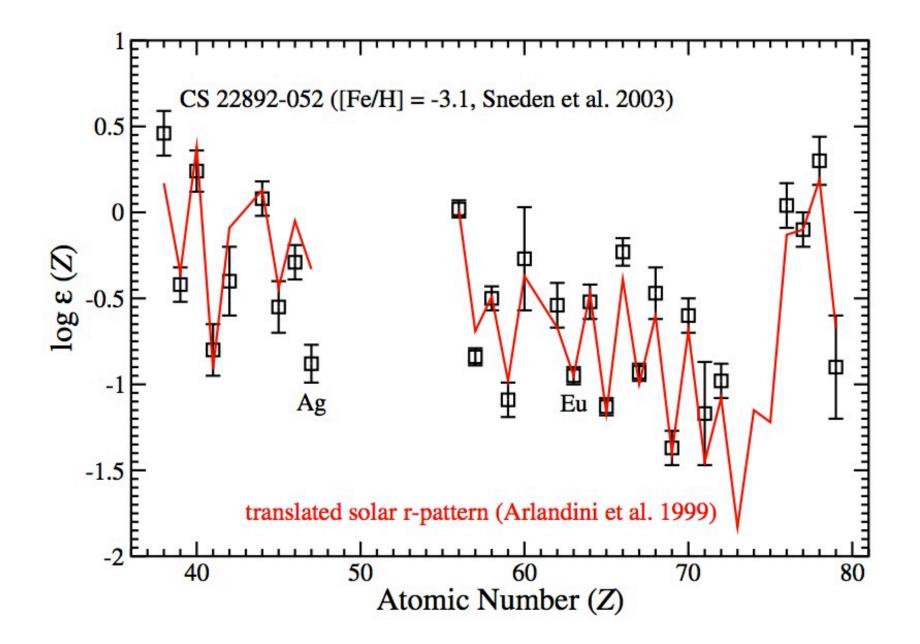


from Arnould et al. 2007, Physics Reports, 450, p. 97

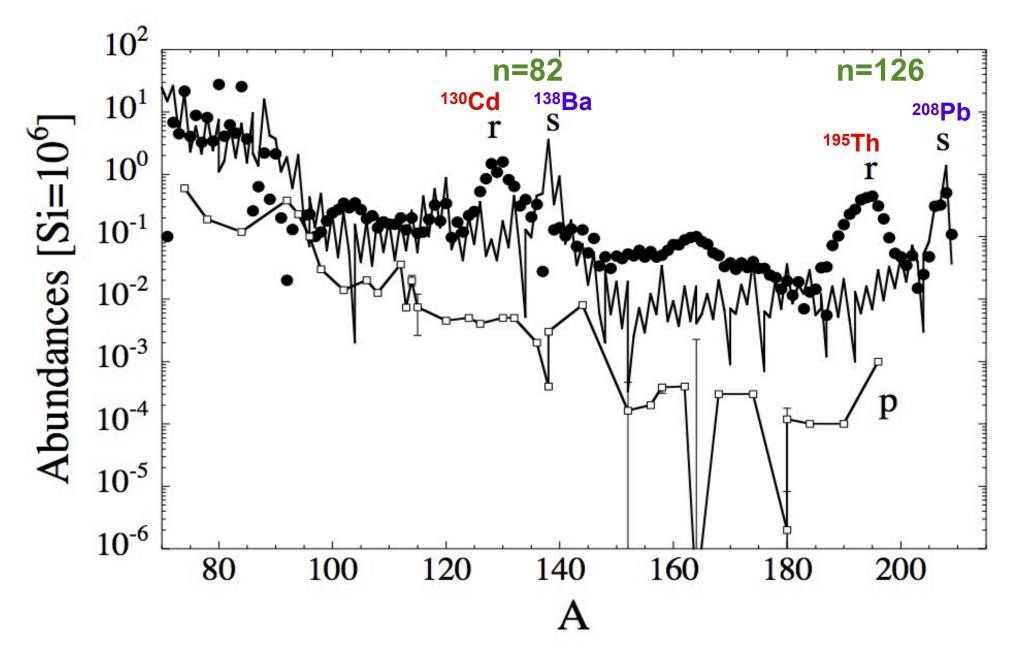
solar system - r process



from Arnould et al. 2007, Physics Reports, 450, p. 97



from Qian & Wasserburg 2007, Physics Reports, 442, p. 237



from Arnould et al. 2007, Physics Reports, 450, p. 97