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New s-process yields and surface abundances from asymptotic giant branch models

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Theoretical stellar nucleosynthesis calculations allow direct comparison between predicted stellar abundances and observations, as well as interpretation of the isotope composition of meteoritic components. Our computational method for calculating predictions for stellar abundances from AGB stars involves two steps: first, the evolution of the stellar structure is calculated by the *Stromlo* stellar structure evolution code[1], and second we feed the stellar structure inputs (T, ρ, and convective velocities) into the *dppns45* post-processing code[2] that solves simultaneously the abundance changes due to nuclear reactions and to convective mixing for 328 nuclear species. In this study we upgrade the reaction network of the post-processing code to account for the temperature and density dependence of the radioactive decay and electron captures following the compilation of NETGEN (Nuclear NETwork GENerator)[3], and a large number of neutron-capture rates based on ASTRAL (ASTrophysical Rate and rAw data Library)[4], which contains re-evaluated experimental MACS of several neutron-capture reactions. The results of the work are new theoretical *s*-process yields and surface abundances for AGB stars with initial masses 2.5, 3 and 4 $M_\odot$ for half-solar and double-solar metallicity, and 2 $M_\odot$, 3 and 4 $M_\odot$ for solar metallicity. We compare our predictions with the previous model predictions, predictions from the FRUITY database[5], and isotopic ratios measured in presolar SiC grains.

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