THE SYMBIOTIC-BARIUM STARS LINK

V.V. SMITH
McDonald Observatory and Dept. of Physics, Univ. of Texas
K. CUNHA
Observatorio Nacional, Rio de janeiro, Brasil
A. JORISSEN
Institut d'Astronomie et d'Astrophysique, ULB, Belgium
AND
H.M.J. BOFFIN
Dept. of Physics and Astronomy, Univ. of Wales, U.K.

An abundance analysis of the yellow symbiotic systems AG Dra and BD-21°3873 reveal them to be metal-poor giants ([Fe/H]=-1.3) enriched in the heavy s-process elements. The heavy-element abundance distributions of those two stars are almost identical and are best reproduced by a s-process with a neutron exposure parameter of 1.2-1.3 mb^{-1} and a neutron density log $N_n = 8.3$. These two systems thus link the symbiotic stars to the binary barium and CH stars which are also s-process enriched. These binary systems, owe their abundance peculiarities to mass transfer from thermally-pulsing asymptotic giant branch stars, which have since evolved to become white-dwarf companions of the cool stars we now view as the chemically-peculiar primaries. We also derive the spectroscopic orbits of those two symbiotic systems and find them similar to those of barium and CH stars. Finally, because the luminosity function of low-metallicity K giants is skewed toward higher luminosities by about 2 magnitudes relative to solar-metallicity giants, we argue that lower metallicity K giants have larger mass-loss rates. It is this larger mass-loss rate that drives the symbiotic phenomena in AG Dra and BD-21°3873. A complete description of this work can be found in Smith *et al.* (1996, A&A **315**, 179 and 1997, A&A **324**, 97).

https://doi.org/10.1017/S0074180900114123 Published online by Cambridge University Press