

^{18}O AND THE ORIGINS OF HYDROGEN-DEFICIENT CARBON STARS AND R CORONAE BOREALIS STARS

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We have detected enormously enhanced abundances of ^{18}O and correspondingly small values of $^{16}\text{O}/^{18}\text{O}$ in many hydrogen-deficient carbon (HdC) stars and R Coronae Borealis (R CrB) stars, essentially all of stars of those types of stars that are cool enough to possess detectable overtone bands of CO and for which we have obtained K band spectra. In the HdC stars ^{18}O is more abundant than ^{16}O , in one case by roughly a factor of 5 ($^{16}\text{O}/^{18}\text{O} \approx 0.2$). In R CrB stars values of $^{16}\text{O}/^{18}\text{O}$ range from 10 to near unity. The solar and interstellar values of the ratio are approximately 500. The abnormal but similar ratios suggest a common origin for the two types of stars and provides a new way to discriminate between various formation scenarios. Of the two leading candidates for the origin of R CrB stars, white dwarf mergers and final helium flashes, the former appears more plausible, although further detailed modeling of the merger process and the thermonuclear reactions that occur during it are required.