?
$^{1}{}_{2}{}^{1}2$
$J =$
2−
1
0.9
20 $R_\star$
32
750 $R_\star$
1
?
&
$2\times$
$10^{-6} M_\odot$
$^{-1}$
$_{2}001, as it has been over the past \sim$
46 $R_\star$
$_{1}994 and therefore dust is unlikely to be responsible for the bulk mass loss. This raises the important point that if the mass loss f$
$type supergiants. Radiation pressure on atoms and molecules is another potential contributing candidate as a mass loss mecha$
$loss initiators such as convection or magnetic dynamo cycles.$
$_{1}966, Betelgeuse is now known to be an oxygen-$
$rich star. The comprehensive study of CO and OH ro-$
$vibrational bands by [?] found log_{10}\epsilon$
=
8.4
$_{10}\epsilon =$
8.8
$log_{10}\,\epsilon(X) = log_{10}\,(X/H)+12,$
(1)
=
2.5
?
$_{10}\epsilon =$
8.6
?
8−
$10\,M_\odot$
$_{1}978. The observed^{12}{}^{13}$
$_{2}003, eggleton_{2}007 has consistently found to be between 6 and 7 lambert_{1}974, hinkle_{1}976, bernat_{1}979, harris_{1}984, well below th$
$_{t}emplate/5/bernat_{n}ew.ps[Bernat(1979)CO line profiles showing two sharp line cores.]CO ro - vibrational fundamental lin$
9
16
$^{-1}$
$^{-1}$
μ
$^{12}C^{16}O$
$^{13}C^{16}O$
?
??
$9 km\,s^{-1}$
$_{exc}$
200 K
$v_{turb} \simeq$
4^{-1}
$_{CO} =$
$4.7\times$
$10^{17} cm^{-2}$
$16 km\,s^{-1}$
$_{exc}$ =
K
$v_{turb} \simeq$
1^{-1}
$_{CO} =$
$1.2\times$
$10^{16} cm^{-2}$
?
55
?
$_{1}962 and both features had been detected in high spectral resolution atomic Na and K absorption profiles goldberg_{1}975.$
$_{t}emplate/5/huggins_{1}987.ps[trim = 30pt 250pt 20pt 200pt, clip, width = 7.5cm, height = 6.5cm]/home/eamon/thesis/thes$
?
$J =$
2−
1
30
$^{-1}$
?
10
$J =$
1−
0
?
?
$J =$
2−
1
??
(2−
1)/(1−
0)
16
$J =$
2−
1
?
??
$J =$
2−
1