

DUST EMISSION FROM SYMBIOTIC STARS: INTERPRETATION OF IRAS
OBSERVATIONS

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SUMMARY. Symbiotic stars are strongly believed to be binary systems - a hot component presumably a white dwarf ionizing and exciting gas from a cool primary star undergoing mass-loss. Silicate dust temperatures for six symbiotic stars namely CH Cyg, UV Aur, HM Sge, RX Pup, V1016 Cyg and RR Tel are determined for the first time using IRAS-LRS data. Some of these stars showed an outburst activity which was caused probably due to hydrogen shell flash in the secondary white dwarf as a result of mass transfer from the primary M giant; while others had been relatively quiescent. All the stars showed indications of the presence of silicate dust grains except perhaps UV Aur. The dust temperatures in the symbiotic stars which had in the past an outburst activity are in general much smaller (by 400 K) than those in the symbiotics which had been quiescent and not shown any nova-like activity. Also there is an indication from our analysis that in the case of the former the dust masses are larger and the shells are spatially more extended than in the case of the latter. These results are given in detail in Table 1. Our results also indicate that the grain sizes could be larger, the earlier the outburst was, as revealed by the relative strengths of the 10 and 18 μ features in the case of the symbiotic novae. Our results support the hypothesis that during an outburst there would be a common envelope of dust blown farther and farther away by the nova wind resulting in the dust parameters described in the paper; while in the case of the quiescent symbiotics, the Mira dust envelopes get constantly heated up by the hot companion star.

(Full paper to be submitted to Astronomy and Astrophysics)

Table I : Silicate Dust Parameters in Symbiotic Stars

Star	Type	Dust Shell 1		Dust Shell 2		Distance (p.c)	Dust mass M_d ($10 \mu_m$) M_\odot	Outburst year
		T_1 ($^\circ\text{K}$)	Radius r_1 (AU)	T_2 ($^\circ\text{K}$)	Radius r_2 (AU)			
CH Cyg	S	750	4.4	67	440	400	1.6E-6	-
UV Aur	S	735	3.6	32	3,400	1000	1.4E-7	-
HM Sge	D	345	46.0	29	12,800	2000	2.0E-6	1975
RX Pup	D	344	42.0	65	10,600	1000	6.3E-7	1972/80
V1016 Cyg	D	334	17.0	30	19,500	3000	1.2E-6	1964
RR Tel	D	270	60.0	65	1,025	2500	3.5E-6	1944
R Agr*	D	800	4.6	87	184	300	3.0E-8	-

* Taken from Anandarao and Pottasch (1986) and given here for comparison.