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Rate constants for the formation of SiO by radiative association[1]
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High quality molecular data for the low-lying states of SiO are computed and used to calculate rate constants for radiative association of Si and O. Einstein A-coefficients are also calculated for transitions between all of the bound and quasibound levels for each molecular state. The radiative widths are used together with elastic tunneling widths to define effective radiative association rate constants which include both direct and indirect (inverse predissociation) formation processes. The indirect process is evaluated for two kinetic models which represent limiting cases for astrophysical environments. The first case assumes an equilibrium distribution of quasibound states and would be applicable whenever collisional and/or radiative excitation mechanisms are able to maintain the population. The second case assumes that no excitation mechanisms are available which corresponds to the limit of zero radiation temperature and zero atomic density. Rate constants for SiO formation in realistic astrophysical environments would presumably lie between these two limiting cases.

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