The influence of non-equilibrium dust formation on the atmosphere of brown dwarfs

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Available dust models often assume phase-equilibrium for dust formation to deliver the depletion of gas phase elements which form condensed matter. These models are successfully used to provide opacities in radiative transfer codes. More detailed, self--consistent modeling of the quasi--static dust problem using a kinetic approach assumes equilibrium chemistry and considers nucleation of TiO2 seed particles, a dirty growth and gravitational drift of the particles (Woitke & Helling 2003, 2004). Nevertheless, the feedback on atmospheric structures could not been taken into account until now: The problem of coupling the dust formation and its impact on the radiation field is iteratively being solved using the classic stellar atmosphere code PHOENIX (Hauschild & Baron 1999) by solving the frequency dependent radiative transfer and the structure of the atmosphere in hydrostatic equilibrium. The dust model by Woitke & Helling (2003, 2004) and Helling & Woitke 2006) for oxygen--rich dwarfs needs an atmospheric structure and provides properties of the dust clouds, which, in turn, allows to calculate dust opacities as input for the radiative transfer problem. We demonstrate recent progress of modeling late--type stars of spectral type L having effective temperatures of 1700...2100 K. We discuss the change of spectral appearance and the change of 2MASS-colors J--K with varying column density of the dust.