

A mixed protoatmosphere formed on a protoplanet.

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We discuss the processes of the atmosphere formation expected from recent planetary formation theory. There are three end-member possibilities of early atmospheres: a gravitationary captured solar composition atmosphere, a degassed atmosphere from planetesimals during accretion, and an atmosphere added at the last stage of accretion as a 'late veneer'. The real atmosphere should be a mixed one of these three atmospheres.

Recent planetary formation theories suggests the formation of protoplanets in a gas nebula followed by series of giant impacts among protoplanets. If volatile containing

planetesimals are accreted in a nebula gas, a mixed atmosphere that is composed of gravitationally captured solar component and degassed component from planetesimals is formed. Since at least some part of the protoatmosphere survives the giant impact stage,

we need to consider the properties of such a mixed atmosphere. The behavior of such an atmosphere seems to be complicated. Here, I discuss some problems related to such hypothetical atmospheres.