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Analysis on the formation and growth of condensing aerosol particles in a turbulent mixing layer KUN ZHOU, ANTONIO ATTILI, AMJAD AL-SHAARAWI , FABRIZIO BISETTI, CCRC, KAUST — A simulation of the formation and growth of dibutyl phthalate (DBP) particles in a three-dimensional turbulent mixing layer is performed to investigate the effects of turbulence on the aerosol evolution. A fast, hot stream with DBP vapor is mixed with a slow, cold stream achieving supersaturation by turbulent mixing. The aerosol dynamics are solved with the quadrature method of moments, and the moments are transported via a Lagrangian particles scheme. The results show that aerosol particles are formed in the cold stream, while they grow rapidly in the hot stream. The differential diffusion of temperature/vapor concentration and aerosol particles is investigated through conditional statistics in the mixture fraction space. Aerosol particles formed in the cold stream tend to drift towards the hot stream and grow substantially there.

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