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## Technical note: Analytical formulae for the critical supersaturations and droplet diameters of CCN containing insoluble material

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**Abstract.** In this paper, we consider the cloud drop activation of aerosol particles consisting of water soluble material and an insoluble core. Based on the Köhler theory, we derive analytical equations for the critical diameters and supersaturations of such particles. We demonstrate the use of the equations by comparing the critical supersaturations of particles composed of ammonium sulfate and insoluble substances with those of model organic particles with varying molecular sizes.

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