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Volatile Loss during Collisional Growth of Planets SARAH STEWART, SUJOY MUKHOPADHYAY, Harvard University — During the end stage of planet formation, rocky planets grow by collisions with planetary embryos and planetesimals. Impact velocities are typically 1 to 4 times the escape velocity of the largest bodies (up to about 40 km/s). The collision velocities are large enough to induce substantial vaporization of the projectile. Using the collision history of growing planets from recent N-body simulations, we present estimates of the loss of volatiles by vaporization of impacting planetesimals and erosion of the atmosphere during the end stage of planet formation. We propose that major differences in the noble gas signatures of the atmospheres of Venus, Earth and Mars are a result of the different outcomes of late impact events on each planet.

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