Formation and Evolution of Planetary Crusts: The Lunar Example

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The Moon is one of the few planetary bodies in the solar system that retains much of its primary crust. The highland crustal terrains are known to be highly feldspathic and many low-lying regions are filled with basaltic maria derived from the mantle. The cumulative impact record can be used as probes to the interior, and high resolution global compositional data from modern sensors now allow the stratigraphy of the crust to be evaluated. The Magma Ocean model for formation of a plagioclase-rich crust is confirmed by these new data. However, the compositional data also raise new questions not accounted for in the models. How can the observed massive scales of 98% pure plagioclase have formed? What is the origin of the noritic component seen pervasively across the megaregolith? How and where in the crust did the new Mg-spinel rock type form? How are the observed exposures of olivine and troctolite components related to the crust or the mantle? Earth's nearest neighbor has much to teach us about this early phase of evolution of a primary crust.