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Sons of the Moon. Forming bells of lunar regolith by slip casting

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Music has enriched the spirits of humans in the Earth over centuries. After stepping the moon, the civilization has dreamed to colonize the moon and neighbor planets. In our imagination the future life in such extraterrestrial colonies will be very demanding, requiring also the ability to prepare in situ objects and tools using the natural resources. ISRU (in situ resource utilization) will provide materials for life support, propellants, construction and shielding materials, and energy to a spacecraft payloads or space exploration crews. This is why the studies on lunar and mars regolith simulants has considerably grown in the last years. But, ISRU can also be relevant to cover other intangible, but nor for it less important, “human basic needs”. The aim of this project was to approach to the sound of the instruments manufactured with such regoliths and, in particular, to study the shaping parameters of simple percussion instruments, such as bells, using lunar regolith material. Therefore, in this work a lunar regolith simulant has been selected and fully characterized in terms of particle characteristics, mineralogy, phases, and microstructure. The broad size distribution and the presence of small sized rocks in the simulant makes it necessary a controlled milling a sieving for a reliable processing. After that, the stability of aqueous suspensions was studied by means of zeta potential and rheological measurements. The

optimized slurries were slip cast in plaster moulds and the pieces were sintered at temperatures of 1100-1150°C, achieving densities of around 2.8 g/cm³. The phase development was studied by DRX and the microstructure at different sintering conditions was observed by SEM. The sound of both the lunar regolith simulant and the porcelain bells can be heard at <https://www.youtube.com/watch?v=ulrFeb6fsd8>

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