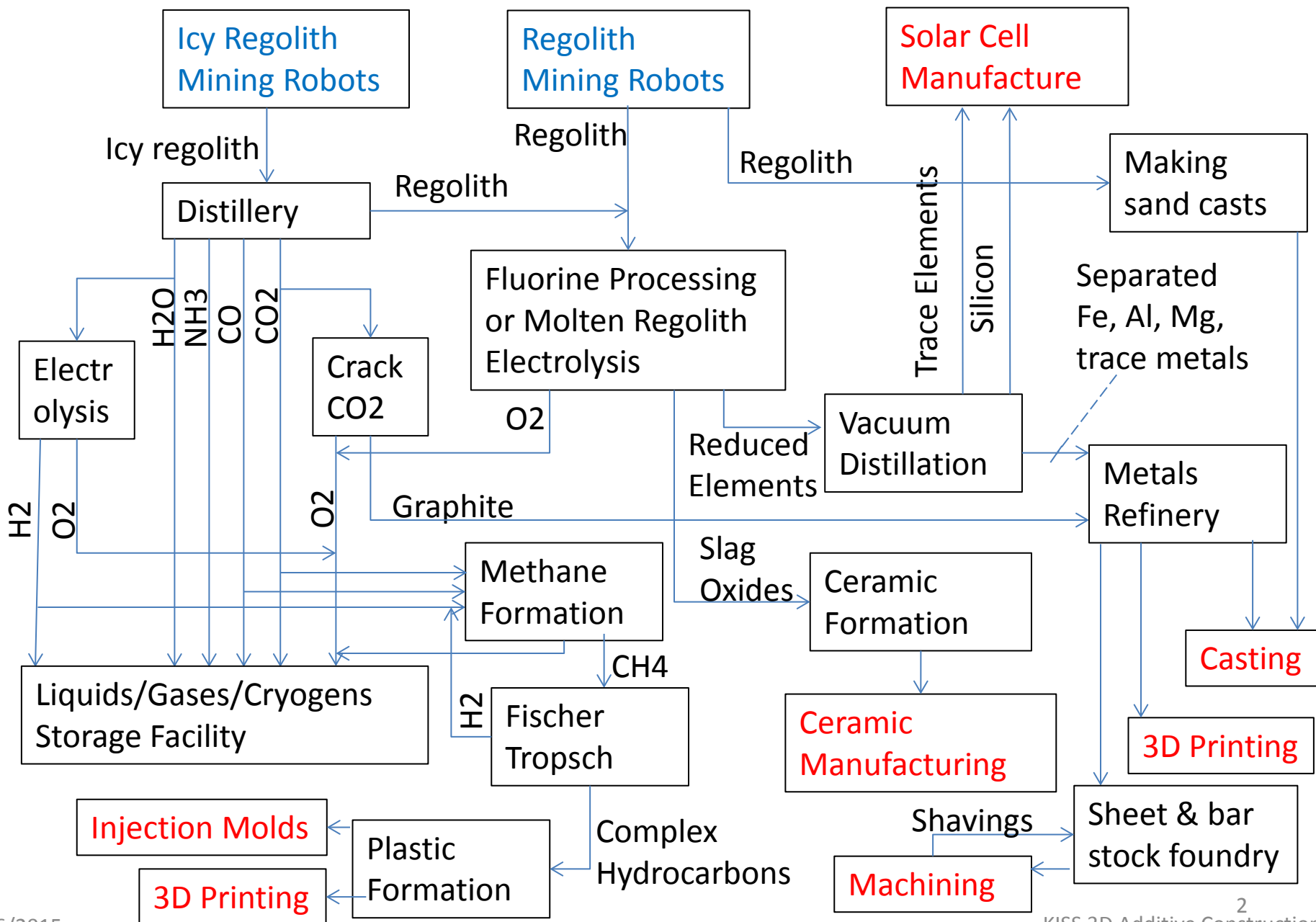


Industrial Production Processes for Materials on the Moon, Asteroids and Mars

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Lunar Mining, Materials Processing, and Manufacturing



Notes

- The two boxes labeled “Fluorine Processing or Molten Regolith Electrolysis” and “Vacuum Distillation” may be replaced by Ionic Salt processing.
- Alternatively, the box labeled “Vacuum Distillation” might be replaced by magnetic liquid separation.

Lunar Materials Production

Label	Builds Upon	Additional Processes (cumulative with “builds upon”)	Additional Materials Produced (cumulative with “builds upon”)
1	N/A	Sieve and/or grind regolith	Regolith
2	1	Molten Regolith Electrolysis	“Mongrel Alloy” Ceramic Oxygen
3	1,2	Vacuum Distillation or equivalent	Elemental Aluminum, Iron, Magnesium, Calcium, Silicon, Titanium. (Also, if regolith obtained from KREEP terrane, then Potassium, Rare Earth Elements, and Phosphorus)
4	1-3	Metals Refinery	Good alloys
5	N/A	Ice Mining & Distillation	H ₂ O, CO, CO ₂ , NH ₃ , many compounds and trace metals
6	5	Fischer Tropsch process	CH ₄ , plastics, rubbers
7	1-6	Metals Refinery including carbon from 5 & 6	Steel
8	1-3	Slaking and cement production	Lime and cement
9	1-8	Advanced processes	Anything you want

Asteroid Materials Production

Label	Builds Upon	Additional Processes (cumulative with "builds upon")	Additional Materials Produced (cumulative with "builds upon")
1	N/A	Crush and sieve	Regolith
2	1	Magnetic beneficiation	Fe-Ni alloy (some asteroids)
3	1,2	Mineral beneficiation (electrostatic? Density separation?)	Clay (carbonaceous asteroids)
4	N/A or 1	Heating and volatile capture with distillation	H ₂ O, complex organics
5	1	Molten Regolith Electrolysis	Mongrel alloy (all asteroids) Ceramic Oxygen
6	1,5	Vacuum Distillation or equivalent	Elemental Aluminum, Iron, Magnesium, Calcium, Silicon, Titanium (depending on minerals in the asteroid)
7	1,5,6	Metals Refinery	Good alloys
8	4	Fischer Tropsch process	CH ₄ , plastics, rubbers
9	1,5,6	Slaking and cement production	Lime and cement
10	1-9	Advanced processes	Anything you want

Mars Materials Production

Label	Builds Upon	Additional Processes (cumulative with “builds upon”)	Additional Materials Produced (cumulative with “builds upon”)
1	N/A	Sieve and/or grind regolith	Regolith, Clay if you drive to a deposit of it
2	N/A	Ice mining & distillation	Water, unknown chemicals
3	N/A	Atmospheric Capture	CO ₂ , N ₂
4	1-3	Fischer Tropsch	CH ₄ , Plastics, Rubbers
5	1	Molten Regolith Electrolysis	“Mongrel Alloy” Ceramic Oxygen
6	1,5	Vacuum Distillation or equivalent	Elemental Silicon, Iron, Aluminum, Magnesium, Calcium, Sulfur, Sodium, Phosphorus, Titanium, Chlorine, Potassium, Chromium, Manganese, trace elements (depends on the local soil mineralogy)
7	1,5,6	Metals Refinery	Good alloys
8	1,2,5,6	Slaking and cement production	Lime and cement
9	1,2	Frasch Process	Sulfur
10	1-9	Advanced processes	Anything you want