What is claimed is:

1. A process of forming an expanded hexagonal layered mineral (HLM), comprising:

immersing at least a portion of an HLM rock in a slurry constituted by a mixture of expanded HLM rock, a metal salt and an organic solvent, with the slurry having the following composition: HLM rock: 15–20 wt%; HLM flake: 0.1–5 wt%; and an electrolyte of 80–160 g/L of $LiClO_4$ (5–10 wt%) in propylene carbonate: 70–80 wt%;

wherein the HLM rock has atomic interlayers each having an hexagonal lattice structure, with the atomic interlayers separated by interlayer spacings;

electrochemically charging the HLM rock by incorporating the HLM rock into at least one electrode and performing electrolysis through the slurry using the at least one electrode, thereby introducing the organic solvent and ions from the metal salt from the slurry into the interlayer spacings of the HLM rock to form 1$^{st}$-stage charged HLM that exfoliates from the HLM rock; and

expanding the 1$^{st}$-stage charged HLM by applying an expanding force to increase the interlayer spacings between the atomic layers.

2. The process according to claim 1, wherein the HLM is one selected from the group of HLMs comprising: graphite, molybdenum disulfide, tungsten disulfide (diselenide), hexagonal boron nitride, vanadium pentoxide, and vanadium X oxides.

3. The process according to claim 1, wherein the expanding force includes at least one of heat, sonication and pressure.

~~4. The process according to claim 1, including forming the slurry to have the following composition:~~

~~HLM rock: 15–20 wt%;~~

~~HLM flake: 0.1–5 wt%; and~~

~~an electrolyte of 80–160 g/L of $LiClO_4$ (5–10 wt%) in propylene carbonate: 70–80 wt%.~~

~~5.~~4. The process according to claim ~~4~~ 1, wherein the slurry has a viscosity in the range from 0.05 Pa•S to 50 Pa•S.

~~6.~~5. The process according to claim ~~5~~ 4, further comprising maintaining the viscosity in the range during the electrochemical charging step by adding expanded HLM to the slurry.

~~7.~~6. The process according to claim 1, further comprising forming the at least one electrode from a metal cage configured to contain the HLM rock.

~~8.~~7. The process according to claim 1, further comprising employing multiple electrodes, each including at least one HLM rock.

~~9.~~8. The process according to claim 1, further comprising conveying the $1^{st}$-stage charged HLM ~~from the slurry~~ to a storage container.

~~10.~~9. The process according to claim 1, further comprising agitating the slurry during the electrochemical charging step.

~~11.~~10. The process according to claim 1, wherein the ~~metal~~ ions from the metal salt include lithium ions, and wherein the organic solvent comprises propylene carbonate.

~~12. A composition of matter useful for performing electrochemical charging of an hexagonal layered mineral (HLM), comprising:~~

~~HLM rock: 15–20 wt%;~~

~~HLM flake: 0.1–5 wt%; and~~

~~an electrolyte of 80–160 g/L of $LiClO_4$ (5–10 wt%) in propylene carbonate: 70–80 wt%.~~

~~13. The composition of matter of claim 12, wherein the composition is in the form of a slurry having viscosity in the range from 0.05 Pa•S to 50 Pa•S.~~

~~14. The composition of matter of claim 12, wherein the HLM is one selected from the group of HLMs comprising: graphite, molybdenum disulfide, tungsten disulfide (diselenide), hexagonal boron nitride, vanadium pentoxide, and vanadium X oxides.~~

~~15.~~11. A process of forming expanded graphite from graphite rock having atomic interlayers with an interlayer spacing, comprising:

immersing at least a portion of a graphite rock in a slurry constituted by a mixture of expanded graphite, a metal salt and an organic solvent, wherein the slurry has following composition: graphite rock: 15–20 wt%; graphite flake: 0.1–5 wt%; and an electrolyte of 80–160 g/L of $LiClO_4$ (5–10 wt%) in propylene carbonate: 70–80 wt%, and wherein the graphite rock includes atomic interlayers with interlayer spacings;

electrochemically charging the graphite rock by incorporating the graphite rock into at least one electrode and performing electrolysis through the slurry using the at least one electrode, thereby introducing ~~the organic solvent and~~ ions from the metal salt from the slurry into the interlayer spacings of the graphite rock to form $1^{st}$-stage charged graphite that exfoliates from the graphite rock; and

expanding the ~~electrochemically~~ $1^{st}$-stage charged graphite by applying an expanding force to increase the interlayer spacings between the atomic layers.

~~16. The process according to claim 15, including forming the slurry to have the following composition:~~

~~graphite rock: 15–20 wt%;~~

~~graphite flake: 0.1–5 wt%; and~~

~~an electrolyte of 80–160 g/L of $LiClO_4$ (5–10 wt%) in propylene carbonate: 70–80 wt%.~~

~~17.~~12. The process according to claim ~~15~~ 11, wherein the expanding force includes at least one of heat, sonication and pressure.

~~18.~~13. The process according to claim ~~15~~ 11, wherein the slurry has a viscosity in the range from 0.05 Pa•S to 50 Pa•S.

~~19.~~14. The process according to claim ~~18~~ 13, further comprising maintaining the viscosity in the range during the electrochemical charging step by adding expanded graphite to the slurry.

~~20.~~15. The process according to claim ~~16~~ 11, further comprising forming the at least one electrode from a metal cage configured to contain the graphite rock.

~~21.~~16. The process according to claim ~~16~~ 11, further comprising employing multiple electrodes, each including at least one graphite rock.

~~22.~~17. The process according to claim ~~16~~ 11, further comprising conveying the $1^{st}$-stage charged graphite ~~from the slurry~~ to a storage container.

~~23.~~18. The process according to claim ~~16~~ 11, further comprising agitating the slurry during the electrochemical charging step.

~~24.~~19. The process according to claim ~~16~~ 11, wherein the ~~metal~~ ions from the metal salt include lithium ions, and wherein the organic solvent comprises propylene carbonate.

~~25. The process according to claim 24, wherein the salt comprises $LiClO_4$.~~