

Claims

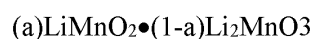
1. A cathode composition for a lithium-ion battery of the general formula:



wherein the composition is in the form of a single phase having a rock salt crystal structure such that an x-ray diffraction pattern of the composition using a Cu K α radiation source has an absence of peaks below a 2 θ value of 35; and
the value of x is greater than 0, and equal to or less than 0.3.

2. A cathode composition according to claim 1, wherein the x-ray diffraction pattern of the composition has an absence of a peak at a 2 θ value of 18.
3. A cathode composition according to claim 1 or claim 2, wherein the single phase crystal structure is absent of any spinel or layered structures.
4. A cathode composition according to claim 4, wherein the single phase crystal structure does not exhibit either a R3(bar)m and/or a C2/m space group.
5. The cathode composition according to claim 1, wherein the value of x is equal to or greater than 0.1.
6. The cathode composition according to claim 1, wherein the value of x is equal to or greater than 0.17.
7. The cathode composition according to claim 1, wherein the value of x is equal to or greater than 0.2.
8. The cathode composition according to claim 1, wherein the value of x is equal to or greater than 0.2 and equal to or less than 0.3.
9. The cathode compound according to claim 1, wherein the value of x is equal to or greater than 0.1 and equal to or less than 0.2.

10. The cathode composition according to any one of the previous claims, wherein the value of x is equal to 0.2.
11. The cathode composition according to any one of the previous claims, wherein the single phase crystal structure exhibits the $Fm\bar{3}m$ space group.
12. The cathode composition according to claim 1, wherein the composition is expressed as the general formula:



wherein two precursors are provided in proportions defined by a, and a has a value in the range greater than 0, and less than 1; and
the precursors are mixed by a ball milling process.

13. The composition according to claim 12, wherein the value of a is equal or greater than 0.15 and equal to or less than 0.7.
14. The composition according to claim 12, wherein the value of a is equal or greater than 0.15 and equal to or less than 0.4.
15. The composition according to claim 12, wherein the composition is $0.4\text{LiMnO}_2 \bullet 0.6\text{Li}_2\text{MnO}_3$.
16. An electrode comprising the cathode composition according to any one of previous claims 1 to 15.
17. The electrode according to claim 16, wherein the electrode comprises electroactive additives and/or a binder.
18. The electrode according to claim 17, wherein the electroactive additive is selected from at least one of carbon or carbon black.

19. The electrode according to claim 17 or claim 18, wherein the polymeric binder is selected from at least one of PVDF, PTFE, NaCMC or NaAlginate.
20. An electrochemical cell comprising a cathode according to any one of claims 16 to 19, an electrolyte, and an anode.