first electrode connected to the second electrode, the first electrode comprises a carbon electrode as a conductive solid material, and the second electrode comprises a lithium as a solid electroactive metal.

22. The method of claim **21**, wherein the first electrode comprises a carbonaceous material selected from the group consisting of graphite, hard carbon, carbon black, graphite felt, carbon nanotubes, carbon fibers, graphene, and combinations thereof.

23. The method of claim **21**, wherein the second electrode further comprises a metal selected from the group consisting of Na, K, Zn, Si, Mg, Ca, Al, Sn, Fe, and combinations thereof.

24. The method of claim **21**, wherein the first redox couple comprises an organic compound.

25. The method of claim **24**, wherein the organic compound is selected from the group consisting of TEMPO, anthroquinones, DBBB, sulfides, disulfides, polysulfides, nitroxyl radicals, galvinoxyl radicals, carbonyl compounds, quinones and quinone derivatives, TEMPO, metallocenes ferrocenes, carbazoles, tertiary amines, 2,5-di-tert-butyl-1,4-dialkoxybenzenes, quinoxalines, phthalocyanines, porphyrins, pyrazines, and combinations thereof.

26. The method of claim **21**, wherein the first redox couple comprises an inorganic compound.

27. The method of claim **26**, wherein the inorganic compound is selected from the group consisting of sulfur and sulfur compounds, selenium and selenium compounds, iodides and polyiodides, bromides and polybromides, chlorides and polychlorides, and combinations thereof.

28. The method of claim **27**, wherein the inorganic compound comprises Li_xS_y, wherein x is from 0 to 4, and y is from 1 to 8.

29. The method of claim **21**, wherein the first redox couple comprises a organometallic compound.

30. The method of claim **29**, wherein the organometallic compound comprises a ferrocene compound.

31. The RFB of claim **1**, wherein the first redox couple has a concentration greater than 0.1 M in a liquid solvent.

32. The RFB of claim **1**, wherein the first redox couple has a concentration greater than or equal to 0.5 M in a liquid solvent.

33. The method of claim **21**, further comprising metalating the first electrode with metal from the second electrode, thereby forming a metalated conductive material.

34. The method of claim **33**, further comprising extracting metal ions from the second electrode through the metalated conductive material of the first electrode.

35. The method of claim **33**, wherein the first electrode comprises a carbonaceous material, and the metalated conductive material comprises LiC_6.

36. The method of claim **21**, further comprising intercalating metal ions in the first electrode, depositing metal ions on the first electrode, or both.

37. The method of claim **21**, further comprising controllably flowing the first redox couple dissolved in the solution or contained in the suspension from a reservoir to the first half cell via a conduit and a flow regulator, the reservoir containing a supply of the first redox couple dissolved in the solution or contained in the suspension.

38. The method of claim **21**, further comprising circulating an electrolyte in the second half cell.

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