Abstract for OakRidge

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Increased Energy Storage Efficiency with Magnetism

The input resistance of most batteries is quite large and the output resistance is usually its complement in size. This resistance has been called concentration polarization, or increase in diffusion length. Presently efforts to decrease this resistance have been to decrease the spacing of electrodes, the use of pumping of the electrolyte being confined to electromachining and large scale electrochemical production. However if the electrodes or current collectors are magnetized, the natural convection combined with the Lorentz force causes rapid stirring in a helical form very close to the electrical double layer. Since the convection in the earth's gravitational field increases with the current density there is a feed back mechanism involved which favours high output and charging currents. The very rapid stirring favours the modification of pasting asperities and longer cycle life. The efficiency of return of stored energy has been measured at 93.1%