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Preface

Since the introduction of hybrid electric automobiles ('hybrids') around the turn of the century battery manufacturers have been faced with a new and demanding application.

The battery in a hybrid must operate around a state-of-charge (SoC) base line that is well short of 100% SoC, normally within the range 50–80% SoC, in order to be able to accommodate incoming charge from the regenerative braking process. From such a baseline the battery must cope with a virtually continuous succession of charge and discharge events of relatively small magnitude (typically a few percent of the battery capacity) but at very high rates (15*C* discharge and 8*C* charge are not unusual). Such a duty is vastly different from that required in an all-electric vehicle and it is no surprise that batteries for hybrids need to be designed somewhat differently from batteries that have satisfied the earlier needs of automobiles.

The first hybrids to achieve significant sales volumes employed nickel metal hydride batteries but this technology brought with it a substantial cost premium and during recent years much research effort has been devoted to the development of alternative means of storing the energy (more correctly the power) needed in hybrids. Much attention has focused on lithium ion batteries for this task but there has also been significant progress in the evaluation of lead–acid batteries and supercapacitors. The present special issue of the Journal of Power Sources is devoted to descriptions of some of this work.

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