

21a Development of Compression Moldable Thermoplastic Composite Bipolar Plates

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Bipolar plates are by weight, volume, and cost the most significant contributor in a fuel cell stack. Manufacturability is the major cost issue in the mass production of bipolar plates. In this paper we report on progress in the development of polymer composite plates which have excellent mechanical properties and good electrical conductivity. The polymer composites used here consist of preforms generated by means of a wet-lay process which are readily compression moldable allowing the forming of the channels directly into the preforms. The major obstacle is selecting a method which will lead to rapid heating of the preform to a desired processing temperature just before channels are molded into it and the subsequent cooling of part. Results have shown that induction heating is very useful for the application of quickly heating conductive polymer composite materials. Using a heat transfer model, convective and conductive heat losses can be calculated to determine optimum processing parameters such as mold temperature and cooling time.