The simulated FMEA of MEAs in DMFC systems

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An understanding of endurance and stability of direct methanol fuel cell (DMFC) membrane electrode assemblies (MEAs) in extreme conditions is one of the important topics to be accepted as a viable product for portable applications. For instance, in case of possible failure modes of DMFC systems such as malfunction of fuel/air supply components as the key ingredient of balance of plants (BOPs), the performances and robustness of MEAs deserve special attention to design secure FC systems. This failure mode and effects analysis (FMEA) of MEAs on DMFC systems carry out for application of portable power source in various simulated environmental conditions such as subzero, high temperature and completely dry, high humidity. Additionally, changes of MEAs in the view of physiochemical and electrochemical properties investigate when breakdown of fuel/air supply components occurs in the fuel cell BOPs. This research may contribute convincingly to developing the necessary technology to eliminate or mitigate the probable design and process failures through understanding of a variety of failure sources occurring in the DMFC operation and providing their potential solutions to minimize the hazard associated with them.