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Environmental Compatible Circuit Breaker Technologies

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Recent research and development in the field of high-current circuit breaker technology are devoted to meeting two challenges: the environmental compatibility and new demands on electrical grids caused by the increasing use of renewable energies. Electric arcs in gases or a vacuum are the key component in the technology at present and will play a key role also in future concepts, e.g., for hybrid and fast switching required for high-voltage direct-current (HVDC) transmission systems. In addition, the replacement of the environmentally harmful SF₆ in gas breakers and gas-insulated switchgear is an actual issue. This Special Issue comprises eight peer-reviewed papers, which address recent studies of switching arcs and electrical insulation at high and medium voltage. Three papers consider issues of the replacement of the environmentally harmful SF₆ by CO₂ in high-voltage gas circuit breakers. One paper deals with fast switching in air with relevance for hybrid fault current limiters and hybrid HVDC interrupters. The other four papers illustrate actual research on vacuum current breakers as an additional option for environmentally compatible switchgear; fundamental studies of the vacuum arc ignition, as well as concepts for the use of vacuum arcs for DC interruption.

