

Concentrated Winding Permanent Magnet Axial Flux Motor with Soft Magnetic Composite Core

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Abstract : Compacted insulated iron powder is a key material in high volume electric motors manufacturing. It offers high production rates, dimensionally stable components, and low scrap volumes. It is the aim of this paper to develop a three-phase compact single sided concentrated winding axial flux PM motor with soft magnetic composite (SMC) core for reducing core losses and cost. To succeed the motor would need to be designed in such a way as to exploit the isotropic magnetic properties of the material and open slot constructions with surface mounted PM for higher speed up to 6000 rpm, without excessive rotor losses. Higher fill factor up to 70% was achieved by compacting the coils, which offered a significant improvement in performance. A finite-element analysis was performed for accurate parameters calculation and the simulation results are thoroughly presented and agree with the theoretical calculations very well.

Keywords : SMC core, axial gap motor, high efficiency, torque

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