

Movable in devices
has been a substitute
and



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Movable devices such as mobile phones, laptops etc., have need of energy and power but meanwhile the functioning charging lifetime of these power sources is not being improved in agreement with the user demand. In the previous era, the use of liquefied fuels in devices has been a substitute and a fascinating field of research 1, 2. Primarily, wide efforts have been made on direct methanol fuel cells (DMFCs) owing to their activity, high energy density, and easy accessibility of fuel by slight contaminant emissions and efficient energy conversion 3. Though, the commercial use of DMFCs is restricted because of certain serious complications such as (i) process at controlled concentration, (ii) deprived kinetics owing to catalyst poisoning through carbon intermediates produces in methanol oxidation, causing in reduced fuel performance (iii) at room temperature activity is very low 4-6, (iv) methanol crossover, which confines the usage of high methanol concentrations, normally less than 2 M 7 and lastly (v) the expensive Pt (Pt is precise catalyst for the DMFCs). To overcome all of above mentioned problems, DFAFCs have attained attention in current time.

Formic acid is comparatively less poisonous than other liquid fuels and it has very high open circuit potential (1.450 V) theoretically than direct formic acid fuel cells (1.190 V) and proton exchange membrane fuel cells (1.229 V) 8.

Moreover, Formic acid also has a lower crossover flux as compared to methanol and ethanol over nafion, or the proton exchange membrane, because of the repulsion existing by the membrane terminal groups.

Therefore it accelerates proton transport in the anodic part of the fuel cell which leads to high energy conversion 9. Although, the energy density of formic acid is 2086 WhL⁻¹ which is smaller as compared to methanol (4690

WhL-1), it transmits additional energy per unit volume as compared to methanol owing to the fact that concentrated formic acid (20 M or 70 wt %) can be used as a fuel comparatively low concentration of methanol (2 M) 10.

The further main benefit of formic acid to use as a fuel is its creation from environmental leftover by the biomass conversion procedures 11.