

# [Movable in devices has been a substitute and](https://assignbuster.com/movable-in-devices-has-been-a-substitute-and/)

Movabledevices such as mobile phones, laptops etc., have need of energy and powerbut meanwhile the functioning charging lifetime of these power sources is notbeing improved in agreement with the user demand. In the previous era, the useof liquefied fuels in devices has been a substitute and fascinating field ofresearch 1, 2. Primarily, wide efforts have been made on direct methanol fuelcells (DMFCs) owing to their activity, high energy density, and easy accessibilityof fuel by slight contaminant emissions and efficient energy conversion 3. Though, the commercial use of DMFCs is restricted because of certain serious complicationssuch as (i) process at controlled concentration, (ii) deprived kinetics owingto catalyst poisoning through carbon intermediates produces in methanoloxidation, causing in reduced fuel performance (iii) at room temperatureactivity is very low 4-6, (iv) methanol crossover, which confines the usageof high methanolconcentrations, normally less than 2 M 7 and lastly (v) the expensive Pt (Ptis 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 liquidfuels and it has very high open circuit potential (1. 450 V) theoretically thandirect 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 methanoland ethanol over nafion, or the proton exchange membrane, because of therepulsion existing by the membrane terminal groups. Therefore it acceleratesproton transport in the anodic part of the fuel cell which leads to high energyconversion 9. Although, the energy density of formic acid is 2086 WhL-1which is smaller as compared to methanol (4690 WhL-1), it transmits additionalenergy per unit volume as compared to methanol owing to the fact that concentratedformic acid (20 M or 70 wt %) can be used as a fuel comparatively lowconcentration of methanol (2 M) 10.

The further main benefit of formic acidto use as a fuel is its creation from environmental leftover by the biomass conversionprocedures 11.