ABSTRACT

A body force per unit mass acting on mobile charge carriers within a first electrically conducting material is configured to induce at least one region of accumulation of charge within at least a portion of the first material. The magnitude of the associated change in the voltage between two given points within the first material is a function of the relevant electrical properties of the material. A second electrically conducting material can be electrically coupled to the first material via a first electrical contact. The relevant electrical properties of the second material can be configured to be different to the relevant electrical properties of the first material. The voltage difference between the two points in the first material can be different to the voltage difference between two equivalent points in the second material. The difference in the voltage difference can be employed to increase the voltage of mobile charge carriers within a portion of an open or closed electrical circuit relative to another portion of said circuit. A voltage conversion apparatus and method can be used to convert thermal energy into electrical energy, for example.