etchant compositions could potentially do this, such as hydrofluoric acid solution, or some strongly alkaline etching compositions, but to our knowledge these etchant compositions have not been used for this purpose. Furthermore, hydrofluoric acid is toxic, and strongly alkaline etchant compositions would attack the substrate if it is PET.

In general terms, the invention provides that a double ITO structure, that is a structure containing sequential layers of ITO, Silicon dioxide (which may include a dopant material) and ITO, is selectively protected by a patterned photo-resist mask, and that the sequential layers are etched in a single etching step, thereby removing selected portions of the double ITO structure. It has been found that this is possible by employing as the etchant composition an acidic solution containing a transition metal chloride and Hydrochloric acid (HCl).

In some aspects of the present description, a method for etching a layered structure having sequential layers of ITO, SiO2, and ITO formed on a transparent or semi-transparent substrate is provided. The method includes using a patterned mask to expose a portion of the layered structure, and contacting the exposed portion of the layered structure with an acidic solution containing a transition metal chloride and hydrochloric acid (HCl) to remove each layer of the exposed portion of the layered structure.

In some aspects of the present description, a method for etching a layered structure having at least one layer of ITO and at least one layer silicon dioxide (SiO2) formed on a transparent or semi-transparent substrate is provided. The method includes using a patterned mask to expose a portion of the layered structure, and contacting the exposed portion of the layered structure with an acidic solution containing a transition metal chloride and hydrochloric acid (HCl) to remove each layer of the exposed portion of the layered structure.

The invention makes possible a cheaper and environmental friendly way of patterning the double ITO structure, through a dry photo-resist photolithographic

process and wet etching step. In particular, the double ITO structure may be etched using a substantially fluoride-free etchant composition.

It is advantageous to select an etchant composition which etches ITO layers and the Silicon dioxide layer at similar etching rates.

Preferably, the transition metal chloride is ferric chloride or cupric chloride.

The Hydrochloric acid in the etchant composition may have a concentration in the range 0.01 – 1.0N. In one possibility it has a concentration of about 0.02 – 1.0 N. A value towards the lower end of the range (e.g. below 0.5 N) is preferred to minimize the risk of the concentration of Chloride ions accidentally rising too high, which might lead to over-etching and/or release of Chlorine gas. The concentration range 0.01-1.0N is lower than the concentration range used in conventional techniques for etching ITO, which reduces the risk of the patterned photo-resist mask being stripped before the double ITO structure has