

| Conductive | Transparent | Flexible |

## Clevios™ Advanced Materials for new Organic Solar Cell technologies

Heraeus offers two types of aqueous based conductive polymers for use in organic solar cells. Both are based on versions of Clevios™ PEDOT:PSS, but have different functions.

- A “hole transport” layer, improving device efficiency, that also has a smoothing effect in the device. For this function Clevios™ HTL Solar has been specifically developed. Our OLED grades, such as Clevios™ P AI 4083, are also suitable.
- An ITO electrode replacement. The flexible highly conductive Clevios™ PH 500 or PH 1000 types can be used.

Clevios™ materials are more resistant to cracking on bending and so are more reliable than ITO. They provide a flexible non-metallic solution to OPV producers who wish to have not only low cost raw materials but also use economic printing methods.

The wetting property of Clevios™ on P3HT/PCBM, where the contact angle is 30°, is outstanding.

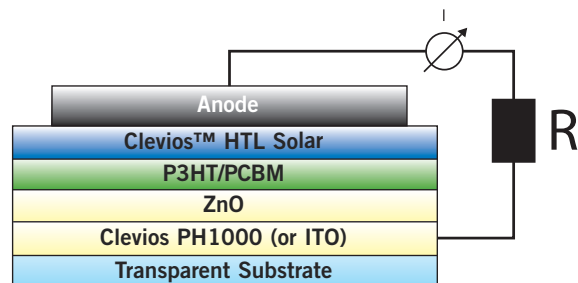
Both types of materials provide flexibility combined with being printable. This leads to the possibility of flexible low cost organic solar cells being available for applications, such as devices for re-charging your mobile phone, becoming a reality in the near future.

Type	Viscosity (mPas)	Resistivity (Ohm · cm)	Work Function (eV)	Contact Angle on P3HT/PCBM
<b>Hole Transport Materials</b>				
Clevios™ HTL Solar	8 – 30	1 – 10	4.8 – 5.0	30°
Clevios™ P AI4083	5 – 12	500 – 5000	5.0 – 5.2	100°

Type	Viscosity (mPas)	Sheet Resistance (Ohm/sq)	Work Function Resistance (eV)
<b>Conductive Materials</b>			
Clevios™ PH 500	30	200*	4.8 – 5.0
Clevios™ PH 1000	35	100*	4.8 – 5.0

\*at 100 nm layer thickness

A typical example of an inverted OPV cell is:



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**Clevios™**