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Large area AR-coating on plastic substrate using roll to roll methods

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Organic substrates achieve an increasing interest for various applications due to cost reduction in small and large area displays, polymer optics, photovoltaic front cover etc. With the need to develop and to provide anti-reflecting (AR) properties to various plastic surfaces in large volume applications such as flat panel displays, automotive displays, portable communication systems or complex optical devices different methods to anti-reflect surfaces for a wide range of materials such as mineral glasses and various plastic materials have been developed. Those methods are ranging from classical additive interference coating to optical inhomogeneous effective medium like surface structures.
The paper compares additive, subtractive and surface morphology changing technologies which are well suited to large area wide web plastic material applications such as standard technique like magnetron sputtering (single layer low index films, classical HL multilayer interference coatings), chemical wet coating, PE-CVD, and several technologies which modify the surface structure of the plastic material by thermo-mechanical methods (embossing) or plasma induced surface modifications to get AR properties.
MF-magnetron sputter technologies are state of the art in large area architectural glass coating, but also applied for wide web roll-to-toll (R2R) deposition of plastic materials such as PET, PEN, TAC or Fluor-Polymers which are the base materials for flat panel displays and flexible photo-voltaic.
In the given paper special emphasis is laid on the comparison of R2R sputter deposition of single and multilayer coatings, PE-CVD deposition of single and multi layers and plasma induced surface modification of polyester films. Examples are given for all of the 3 base technologies. Special attention is paid on the scalability of magnetron based technologies to industrial size.

Keywords
AR coating
surface modification
magnetron sputtering
PET substrate