

Canyon Materials Inc.

• HEBS-glass Photomask Blanks •



Canyon Materials' High Energy Beam Sensitive (HEBS) glass offers one-step fabrication of a gray-level mask. The mask is exposed using a standard e-beam writing tool. Phase levels of diffractive optical elements are immediately visible as gray levels.

HEBS-glass fabrication and the consequent electron beam exposure eliminate alignment errors, providing economical mask

fabrication. After the mask is made, a series of single step-and-repeat optical exposures can generate hundreds of diffractive optical elements on a single substrate. The direct e-beam writing on the low-expansion silica glass eliminates chrome, resist and process chemicals for a zero-waste technique.

Since there is no graininess, HEBS glass is capable of resolution to molecular dimensions. HEBS glass turns dark instantaneously upon exposure to an electron beam, the more electron dosage the more it darkens. Canyon Materials Inc. makes HEBS glass gray level masks from customer's designs. They are typically written with an e-beam writer using a 0.1- μm addressing grid size. Every 0.1- μm spot in the

5 \times 5-in. HEBS glass plate acquires a predetermined transmittance value ranging from 100 percent down to less than 0.1 percent upon e-beam patterning with a predetermined e-beam dosage for each address.

The San Diego-based company says its gray-level mask facilitates new designs and low-cost manufacturing processes for high-performance diffractive optics; asymmetric, irregularly shaped microlens arrays; and general three-dimensional surfaces.

Applications include micro-optical devices, microelectrical devices, micro-opto electromechanical devices, integrated optical devices, two-dimensional fanout gratings, optical interconnects fiber pigtailling diffractive optical elements, refractive microlens arrays, microprism arrays and micromirror arrays.