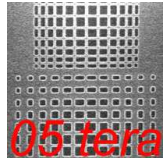
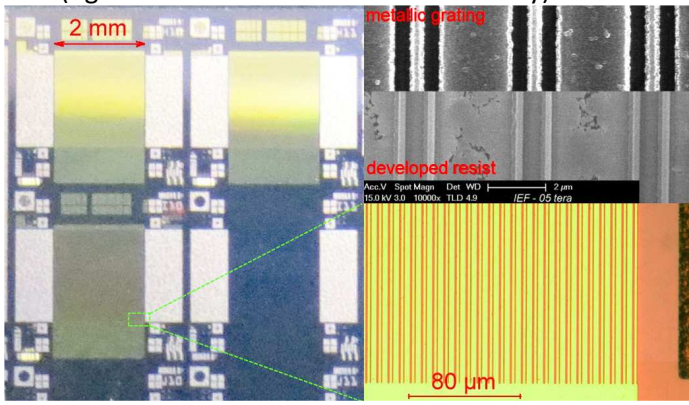
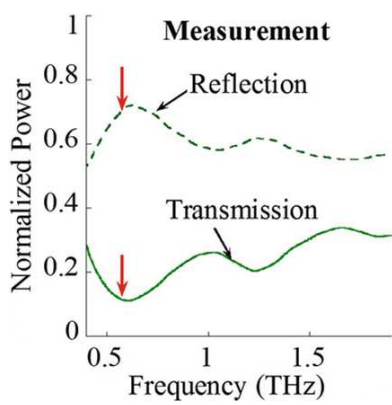


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<p><b>RENATECH thematics :</b> Micro et nano-électronique</p>	<p><b>Starting date :</b> 12-2005</p>
<p><b>Project objectives</b> (10 lines max) :</p> <p>1/ Synthesis of Terahertz waveguides and planar antennas on benzocyclobutene (BCB) for Terahertz emission and detection applications.</p> <p>2/ Realization of thick metallic gratings (500 to 4000 nm lattice periods) for resonant THz detection with 2D plasmons in quantum wells as already done for AlGaIn/GaN, InGaAs/GaAs heterostructure.</p>	
<p><b>Results</b> (figures and text 6 lines max if necessary) :</p> <div style="display: flex; justify-content: space-around; align-items: flex-start;"> <div data-bbox="220 878 912 1281">  </div> <div data-bbox="976 878 1369 1281">  </div> </div> <p>Fig. 1 shows detectors using metallic grating with area of 2 mm × 2 mm on AlGaIn/GaN, with a magnified view of the asymmetric pattern for one detector on Fig. 2 (down). The SEM picture of Fig. 2 (up) displays the 450 nm thick metallic ribbons with 4 μm lattice period of another asymmetric pattern, obtained by lift-off with developed resist also presented under. Fig. 3 shows results of the relative transmission and reflection of such detector around 650 GHz as expected (red arrows). Unfortunately with a metallic grating of 800 nm lattice period, no resonance has been observed around 650 GHz on a Si:H/Si heterostructure in order to get properties of a suspected 2D hole gas.</p>	
<p><b>Valorisation</b> (publications, patents...) :</p> <p>[1] Cao L., Grimault-Jacquín A.-S., Aniel F., "Comparison and Optimization of dispersion and losses of planar waveguides on benzocyclobutene (BCB) at THz frequencies: Coplanar waveguide (CPW), microstrip, stripline and slotline," Progress In Electromagnetics Research B, vol. 52, p. 161, 23 pages, 2013.</p> <p>[2] Cao L., Grimault-Jacquín A.-S., Zerounian N., Aniel F., "Design and VNA-measurement of coplanar waveguide (CPW) on benzocyclobutene (BCB) at THz frequencies," Infrared Physics and Technology, vol. 63, p. 157, 8 pages, 2014.</p> <p>[3] Spisser H., Grimault-Jacquín A.-S., Zerounian N., Aassime A., Cao L., Boone F., Maher H., Cordier Y., Aniel F., "Room-Temperature AlGaIn/GaN Terahertz Plasmonic Detectors with a Zero-Bias Grating," J. Infrared Milli. Terahz. Waves, vol. 37, p.243, 15 pages, 2016.</p>	

**Developments in the Renatech network :**

Main techniques used: Optical and e-beam lithography, PECVD, etching (RIE, ICP, IBE, wet), metal evaporation, lift-off, resin and polymer spin-coating.

Specific process developments: High aspect ratio metal meshes by lift-off and e-beam lithography.