Laser texturing and polishing plastic for a high quality metal-like finish

The Challenge
A major manufacturer of laser marking machines partnered with Synrad Application Engineers to create a new laser marking system that delivers a "premium" metallic finish on plastic cell phone frames. These cell phone frames have a gloss coating which is typically a polyurethane/acrylic hybrid like Alberdingk UC 90 or Primal HG 1000, which are subject to melting and dis-figuration when exposed to common laser wavelengths.

The Opportunity
Finding a solution could prove to be a significant cost reduction point for cell phone manufacturers while potentially improving usability:

- **Material Cost Reduction** - the material cost savings when switching from metal casings to plastic casings would be significant since plastics are easier to source and molding cases is far less expensive than stamping and cutting.

- **Weight Reduction** - significant savings in overall weight would be realized from the users “feel-in-hand” to shipping costs from manufacturer to retailer to end user.

- **Improved Usability** - adding a textured surface, especially to the edges of the cell phone casing increases the user’s grip to prevent slipping.

The transmission curve indicated that a laser at 9.3 µm had 25% less transmission than the more common 10.6 µm lasers available. The lower transmission rate would enable a Synrad laser to lightly mark the gloss coating at high speed while avoiding any damage to the underlying base plastic.

Identifying the 9.3 µm was key, however testing did not end here since Synrad offers several lasers with the 9.3 µm wavelength, including low-power options. To achieve higher production throughput Synrad recommended the ti100p laser, the 100 W power combined with a 9.3 µm wavelength ensured proper texturing and polishing of the gloss coating while delivering maximum throughput speed. When finishing a plastic cell phone frame with a high-quality metal-like finish the ti100p with a 9.3 µm wavelength and wide frequency range delivers both a polished, chrome-like finish and a soft, brushed metal finish.

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ti100p CO₂ Pulse Laser

- Highly recommended for texturing and polishing plastic for a metal-like finish (9.3 µm)
- 100+ W average power/300+ W peak pulse power
- Lightweight integrated RF design
- Factory installed beam expander
- Fast rise/fall time
- Energy efficient

Based on the ti Series high beam quality lasers the ti100p features a fully integrated 48V RF design, making it more compact and energy efficient. Eliminating the external RF supply and RF cabling the ti100p lasers are perfect for integration onto robotic or gantry-type motion systems. The ti100p also includes water cooled high stability models for high repeatability processing in precision applications.

All ti100p lasers feature a factory-installed beam expander with your choice of a 3X, 4X, or 5X expansion ratio. In harsh operating environments, this larger output beam reduces the potential for developing hot spots that can damage exposed optical surfaces.

### Other Recommended Applications

**Electronic Film Cutting**

The high stability delivers very consistent and selective cutting of film layers while high peak power minimizes melt lips on the cut edges.

**Perforating**

Power plus fast rise/fall times delivers precise perforations at high speed, especially useful when perforating food packaging films.

**Plastic Label Cutting**

300W peak pulse power and multiple wavelength options enables clean, precise, mark-free cutting at higher speeds.

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