The Connected World of Glass

• Impact of silicate oxides in the context of our lives
  – Historical examples
  – Innovation is a key ingredient
  – Glass will drive pervasive personal connectivity

• Examples of extremely versatile glass
  – Flat, light weight and damage resistant glass for displays
  – Anti-microbial glass
  – Video is the killer app driving petabit glass fiber optics and personal communications
  – Thin glass on carriers

• Summary
  – Glass speaker demo
Life-Changing Innovation

How We Succeed:

• Tough technology problem

• Close customer collaboration

• Deep materials & process expertise
160 Years of Using Glass In New Ways

CorningWare®

Environmental Technology

1952  1972
Glass Processing

Thin sheet, fusion process

Optical fiber being drawn
Innovation Recipe Drives Strategic Actions

- Deep understanding of a specific technology
- Identification of customers’ difficult systems problems

Demanding Requirements

Material + Process

Differentiated by:
- Uniqueness
- Intellectual Property
- Specialized Capital Investment
Pervasive Personal Information Connectivity: Anywhere, Anytime, and Anyplace

Internet & Cables
- Corning Optical Fiber, Cable, Components & Wireless Solutions

Information Rendition
- Substrate Glass for High-Performance LCD and OLED

User Interface
- Thin, Light weight, High-Performance
Precision Glass Display Surfaces

Fusion Process

AFM Results

Unpolished glass
Ra: 1.7 Å
TTV < 1um
Warp < 30 um

Pristine Surface

Stable

Flat

Thin & Strong

Cover Glass

Encapsulation Glass

Touch Sensor/Barrier Layer

Backplane
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Beyond Displays: Corning® Gorilla® Glass

Potassium replaces smaller sodium

Force absorbed with densification ... no starter flaws, low residual stress

Architectural, automotive, and state-of-the-art home appliance applications

Fluorescent E. Coli on regular glass

Anti-microbial Glass kills >99.99% E. Coli
Pervasive Personal Information Connectivity: Anywhere, Anytime, and Anyplace

Internet & Cables

Corning Optical Fiber, Cable, Components & Wireless Solutions

Information Rendition

Substrate Glass for High-Performance LCD and OLED

User Interface

Thin, Light weight, High-Performance
Video is the killer app driving the next expansion of the Internet
In telecommunication or the personal space

A single modern optical fiber can carry 1.05 Pb/S (Petabit/s) over a kilometer – i.e. enough information to fill 25,000 DVDs every second.

Thunderbolt™ and USB 3.0/2.0 active optical cables launched at CES

Frontiers in Optics/Laser Science XXVIII paper FW6C.3
http://dx.doi.org/10.1364/FIO.2012.FW6C.3
Interposer Temporary Bonding Technology – Corning® Willow™ Glass (thin glass) on Carrier

- Temperatures to > 450° C
- Zero outgassing and no residual residue
- Survives chemical durability testing with common processing chemistries (SC-1, SC-2, Piranha etc.)
- Successfully demonstrated seed layer sputtering. Blind holes or through holes
- Debonding is mechanical release from side

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Summary

- Glass (silicate oxides) has a long history of inventing products with silicate oxides.
- Display glass is pristine, stable, flat, strong, and inhibits the growth of microbes.
- Enables clean air technologies.
- Delivers as much video data as a pickup load of DVDs.
- Changing the world in which we live!
Sounds From Glass Speakers