# ORA

GRAPHENE AUDIO

Developer's Kit Offering

Developer's kit mission

The purpose of this development kit is to demonstrate ORA's **GRAPHENEQ**™ loudspeaker technology to potential partners.

The development kit is ORA's first initiative to demonstrate the capabilities of its innovative audio technology. This first version has constraints due to our objective to provide an early release to interested parties. These constraints will be further removed as we continue to develop the technology. This development kit is the first step towards working with ORA in optimizing their Graphene technology for use in your early adopting products.

GRAPHENEQ™

ORA's proprietary graphene nanocomposite material has been specifically designed and optimized for use in the membranes of acoustic transducers. GrapheneQ is stiff and low density allowing for smaller, lighter, more efficient speakers with improved sound quality.
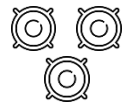

GRAPHENE
≥ 95%

ORA
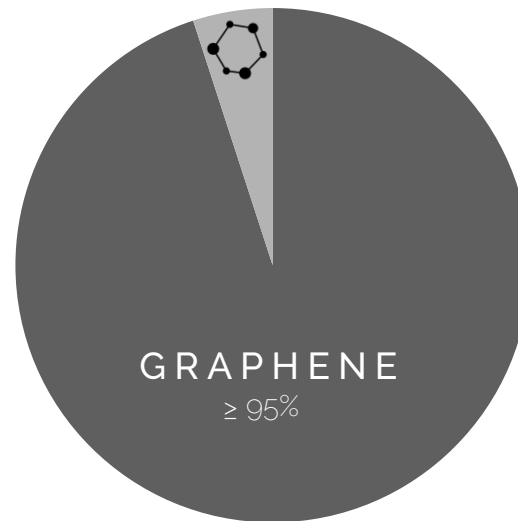
Developer's kit offering

TEST STRIPS
Three, 1cm x 3cm GrapheneQ strips for mechanical testing

PRE-MADE SPEAKER
One prototype 3" enclosed GrapheneQ speaker for testing

CUSTOM CONES/DOMES
Three custom GrapheneQ cones or domes made to your specifications (less than 3" diameter) to test in existing products

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Supported use cases

1. FIGURE OF MERIT
GrapheneQ has a high Young's Modulus and low density making it ideal for use in loudspeaker membranes.

2. IMPULSE RESPONSE
GrapheneQ is low mass and can move quickly. Internal damping is high, reducing ringing effects.

3. SURFACE SCAN
GrapheneQ reduces non-pistonic motions of the diaphragm. The high stiffness material reduces speaker break-up at high frequencies.

4. POWER CONSUMPTION
For an equivalent audio performance, GrapheneQ extends the battery life of portable audio devices relative to paper and Mylar.

5. DISTORTION
GrapheneQ provides improved amplitude linearity, reducing both harmonic and intermodulation distortion.

6. FREQUENCY RESPONSE
Directly replacing a diaphragm with GrapheneQ produces a measurable improvement in high-frequency response.

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Constraints

Since temperature and air pressure vary from place to place, it is necessary to compare testing and documentation of chemical and physical processes with a standard reference condition:

Normal Temperature and Pressure (NTP)

TEMPERATURE
Typical room temperature

HUMIDITY LEVELS
Room level humidity: 20% - 65%

PRESSURE
~ 1 Atm

UV EXPOSURE
Avoid prolonged UV exposure

Success Criteria

We have designed this developer kit to support the following acceptance tests:

1. FIGURE OF MERIT
Produce a FoM proportional to the first bending mode that is at least 80% of a Beryllium membrane of equal weight:

$$FOM = \left[\frac{E}{\rho^3 \cdot (1-\nu^2)}\right]^{\frac{1}{2}}$$

2. IMPULSE RESPONSE
Improved transient and/or damping performance relative to paper, Mylar, Aluminum, or Titanium.

3. SURFACE SCAN
Improved pistonic motion. Reduced speaker "break-up" relative to paper, Mylar, Aluminum or Titanium.

4. POWER CONSUMPTION
Minimum 15% improvement in efficiency (sound power output / electrical power input) relative to paper or Mylar, constant coil impedance.

5. DISTORTION
75% or less average harmonic distortion at 1kHz and above relative to paper or Mylar.

6. FREQUENCY RESPONSE
Reduced frequency response irregularities at high frequency.

For more Information on the Success Criteria please request the Use Case Measurement Guidelines from info@ora-sound.com

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Support post purchase

Every unique cone/dome geometry requires new tooling and testing. Custom cone/dome fixes and alterations will be provided if none of the three provided units are functioning as expected within the specified scope. This applies within 90 days of delivery. Material characteristics can be modified. We are happy to work with you to tune the mechanical characteristics to best fit your application. Please let ORA know in advance if there are any specific mechanical traits desired.

For more information about the cost of this development kit, please contact:

info@ora-sound.com

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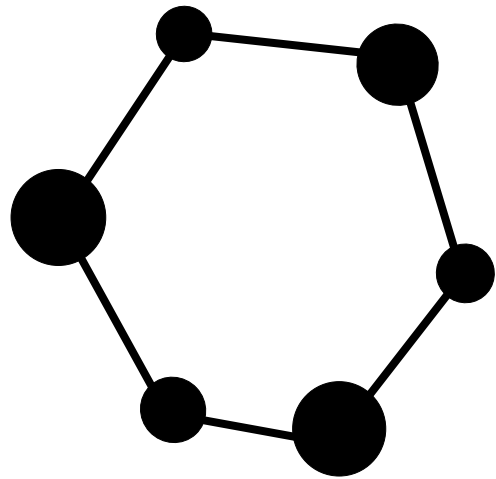
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