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## **Spray-on Transducers for High-Temperature Applications**

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Monitoring the structural health of large valve bodies in high-temperature environments such as power plants faces several limitations: commercial transducers are not rated for such high-temperatures, gel couplants will evaporate, and measurements cannot be made in-situ. To solve this, we have furthered the work of Barrow and Kobayashi in applying a transducer in liquid form by making it more field-deployable; the sintering step is removed, the fabrication time is reduced, and the signal-to-noise ratio is improved using post-processing techniques. Bismuth Titanate (BiT) was used as the piezoelectric material for its high Curie temperature, and three separate chemical binders were demonstrated to work: sol-gel, potato starch, and a proprietary high-temperature inorganic binder (IB). The pros and cons of each chemical binder are compared with respect to substrate compatibility, stable operating temperature, and fabrication time. The BiT/IB combination is highlighted for its compatibility on both reactive and non-reactive substrates, stable operating temperature of 330°C, and quick fabrication time making it ideal for in-situ monitoring of large valve bodies.

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