Composition and structure of oyster cement provides unique materials properties

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Eastern oysters, *Crassostrea virginicas*, form extensive reefs that are vital for maintaining coastal habitats along the Atlantic coast in the United States. These reefs are formed by oysters attaching to one another through the secretion of a complex composite adhesive that solidifies under water and holds the oyster in one location for life. While recent studies [1] found the adhesive to be a mixture of organic and inorganic components, the structure and distribution of these components are unknown. Here we present a combination of x-ray photoemission electron microscope (X-PEEM), scanning electron microscope (SEM), and micro-hardness data, which provide an unprecedented view of the *Crassostrea virginica* adhesive's composition, structure, and materials properties. The data show that the adhesive is non-uniform in both composition and structure, containing not only organics and calcium carbonate polymorphs, as previously observed [1], but also inclusions from the external environment. The variation in composition leads to the materials properties necessary for the adhesive to fulfil its function.

[1] Burkett, Hight, Kenny, and Wilker (2010), *JACS* **132**, 12531-12533.