• Structures of the $\alpha$ and $\beta$ phases of resorcinol, were the first polymorphic pair of molecular crystals solved by X-ray analysis. It was recently stated that "no additional phases can be found under atmospheric conditions."

• Herein, is described the growth and structure of a new ambient pressure phase, $\varepsilon$, through a combination of optical and X-ray crystallography together with computational crystal structure prediction algorithms.

• If polycrystalline spherulite radii are polar, the sense of the polar axis is an essential feature of the form. Here, this determination is made for spherulites of $\beta$ resorcinol with additives that stereoselectively modify growth velocities.

• Both $\beta$ and $\varepsilon$ have the additional feature that individual radial lamellae may adopt helicoidal morphologies. We correlate the appearance of twisting in $\beta$ and $\varepsilon$ with the symmetry of twist-inducing additives.