A method of forming a coating film, in which the coating film is formed by supplying a coating liquid onto a surface of a substrate, while the substrate housed in a processing vessel is rotated together with the processing vessel, includes the steps of coating the surface of the substrate with a solvent, supplying the coating liquid to the substrate, rotating the substrate and the processing vessel at a first rotation speed to diffuse the coating liquid on the surface of the substrate, closing the processing vessel with a lid to seal the substrate in the processing vessel, and rotating the processing vessel with the lid and the substrate at a second rotation speed to uniform a film thickness of the coating film.