uniformity is often inadequate for ultra-thin wafer handling. Second, the thermal release adhesive softens at such low temperatures that the bonded wafer/carrier substrate stack cannot withstand many typical wafer processing steps that are carried out at higher temperatures.

Thermally stable adhesives, on the other hand, often require excessively high bonding pressures or bonding temperatures to achieve sufficient melt flow for good bond formation to occur. Likewise, too much mechanical force may be needed to separate the active wafer and carrier wafer because the adhesive viscosity remains too high at practical debonding temperatures. Thermally stable adhesives can also be difficult to remove without leaving residues.

There is a need for new compositions and methods of adhering an active wafer to a carrier substrate that can endure high processing temperatures and that allow for ready separation of the wafer and substrate at the appropriate stage of the process.

SUMMARY OF THE INVENTION

In one aspect, there is provided a wafer bonding method comprising: applying a bonding composition to either a first substrate or a second substrate by spin-coating, said layer being a uniform material across the thickness formed of the same composition; and bonding the first and second substrates together via the bonding layer, wherein the composition comprises a cycloolefin copolymer.

Embodiments of tThe present invention overcomes the problems of the prior art by broadly providing a wafer bonding method, which includes providing a stack comprising first and second substrates bonded together via a bonding layer, and separating the first and second substrates. The bonding layer is formed from a composition comprising a cycloolefin copolymer (COC) dissolved or dispersed in a solvent system.

Embodiments of tThe invention also provides an article comprising first and second substrates and a bonding layer. The first substrate comprises a back surface and an active surface, which comprises at least one active site and a plurality of topographical features. The second substrate has a bonding surface. The bonding layer is bonded to the active surface of the first substrate and to the bonding surface of the second substrate. The bonding layer is formed from a composition comprising a cycloolefin copolymer dissolved or dispersed in a solvent system.

In a further embodiment, the invention is concerned with a composition useful for bonding two substrates together. The inventive composition comprises a cycloolefin copolymer and an ingredient dissolved or dispersed in a solvent system. The ingredient is selected from the group consisting of tackifier resins, low molecular weight cycloolefin copolymers, and mixtures thereof.