

What is claimed is:

1. A wafer-level method of fabricating optoelectronic modules, the method comprising:  
providing a silicon wafer in which or on which a plurality of optoelectronic devices are formed;  
dicing the silicon wafer to form a plurality of discrete optoelectronic devices;  
subsequently applying upper and lower vacuum injection tools to the plurality of optoelectronic devices each of which is integrated in or disposed on a respective silicon substrate, wherein the tools define spaces separating the silicon substrates from one another;  
injecting a polymer material into the spaces;  
curing the polymer material to form a spacer, wherein the polymer material is substantially opaque to light at wavelengths emitted by or detectable by the optoelectronic devices;  
attaching one or more optics assemblies to the spacer so as to obtain a resulting structure in which each of the one or more optics assemblies is disposed over at least one of the optoelectronic devices; and  
separating the resulting structure into a plurality of optoelectronic modules each of which includes at least one optical channel.
2. The method of claim 1 further including adjusting a height of the spacer prior to attaching the respective optics assemblies.
3. The method of claim 2 wherein the height of the spacer is adjusted by micromachining.
4. The method of claim 1 wherein separating the resulting structure into a plurality of optoelectronic modules includes dicing along lines passing through the spacer.
5. The method of claim 1 wherein attaching one or more optics assemblies to the spacer includes attaching to the spacer a wafer-level optics assembly that spans across a plurality of optical channels.
6. The method of claim 1 further including applying an optical filter layer to at least one of the optoelectronic devices before dicing the silicon wafer.
7. A wafer-level method of fabricating optoelectronic modules, the method comprising:  
applying upper and lower vacuum injection tools to a plurality of optoelectronic devices each of which is integrated in or disposed on a respective silicon substrate, wherein the tools define spaces separating the silicon substrates from one another;  
injecting a polymer material into the spaces;

curing the polymer material to form a spacer;  
performing an optical measurement for at least one of the optoelectronic devices;  
machining at least a portion of the spacer to reduce its height based at least in part on a result of the optical measurement;  
subsequently attaching one or more optics assemblies to the spacer, including attaching a respective one of the optics assemblies to the machined portion of the spacer, so as to obtain a resulting structure in which each of the one or more optics assemblies is disposed over at least one of the optoelectronic devices; and  
separating the resulting structure into a plurality of optoelectronic modules each of which includes at least one optical channel.

8. The method of claim 7 wherein the reduction in height of the spacer is further based on a target focal length.

9. The method of claim 7 wherein the reduction in height of the spacer is achieved by micromachining a surface of the spacer.