View-Guided Point Cloud Completion Supplementary Material

1. ShapeNet-ViPC Examples

In this section, we show more examples of the ShapeNet-ViPC dataset. The entire dataset contains 38,328 objects from 13 categories, *i.e.* airplane, bench, cabinet, car, chair, monitor, lamp, speaker, firearm, sofa, table, cellphone, watercraft. For each shape in dataset, we generate three types of point cloud, including the completed point cloud, partial point cloud with and without noise from 24 different perspectives following the ShapeNetRendering[1]. As shown in Figure 1 and Figure 2, for each object, we show the view image in column 1, the partial point cloud, partial point cloud with noise, and completed point cloud (ground-truth) under the same view point as the view image in columns 2-4, respectively. To show self occlusion and inter-object occlusion more clearly, we show these point clouds under another viewpoint in columns 5-7.

2. Qualitative Comparison Results

In this section, we show more completion results for the qualitative comparison in Figure 3, with more models from each category to demonstrate the generalization ability of our proposed method. As presented in the paper, we compare our method with AtlasNet[3], FodingNet[5], PCN[6] and TopNet[4]. It is easy to observe that the point clouds completed by FoldingNet are relatively messy. It is difficult to identify the shape structures in the completed point clouds. PCN and AtlasNet achieve better qualitative results. However, the local shape details are still missing. TopNet, the hierarchically-rooted tree structure network, produces better visual results where the global shape structure is improved and local details are visually more accurate. Point clouds produced by our method reach the best completion performance among all the comparison methods. Both global structure and local details are better reconstructed. Unlike other methods predicting the locations of all points, our method locates the *Fine part* and *Coarse part* of the shape. We take the Fine part as a constraint, and infer a local point distribution of the Coarse part. In this way, our network can achieve better completion results.

3. Contribution of the Single-view Image

In this section, we show more results about the contribution of the single-view image in Figure 4. For more comprehensive understanding of view contributions, we show the image views together with the values of CD metric[2], according to their quantitative completion result ranks (1, 7, 13, etc), to complement Section *Contribution of the Single-View Image* in the paper. It can be observed that views performing better completion are generally captured from the perspectives more different from the point cloud. Images captured from close perspectives contain less complementary information and produce inferior results. The results suggest that our proposed method could effectively utilize the complementary information from the view modality for point cloud completion.

References

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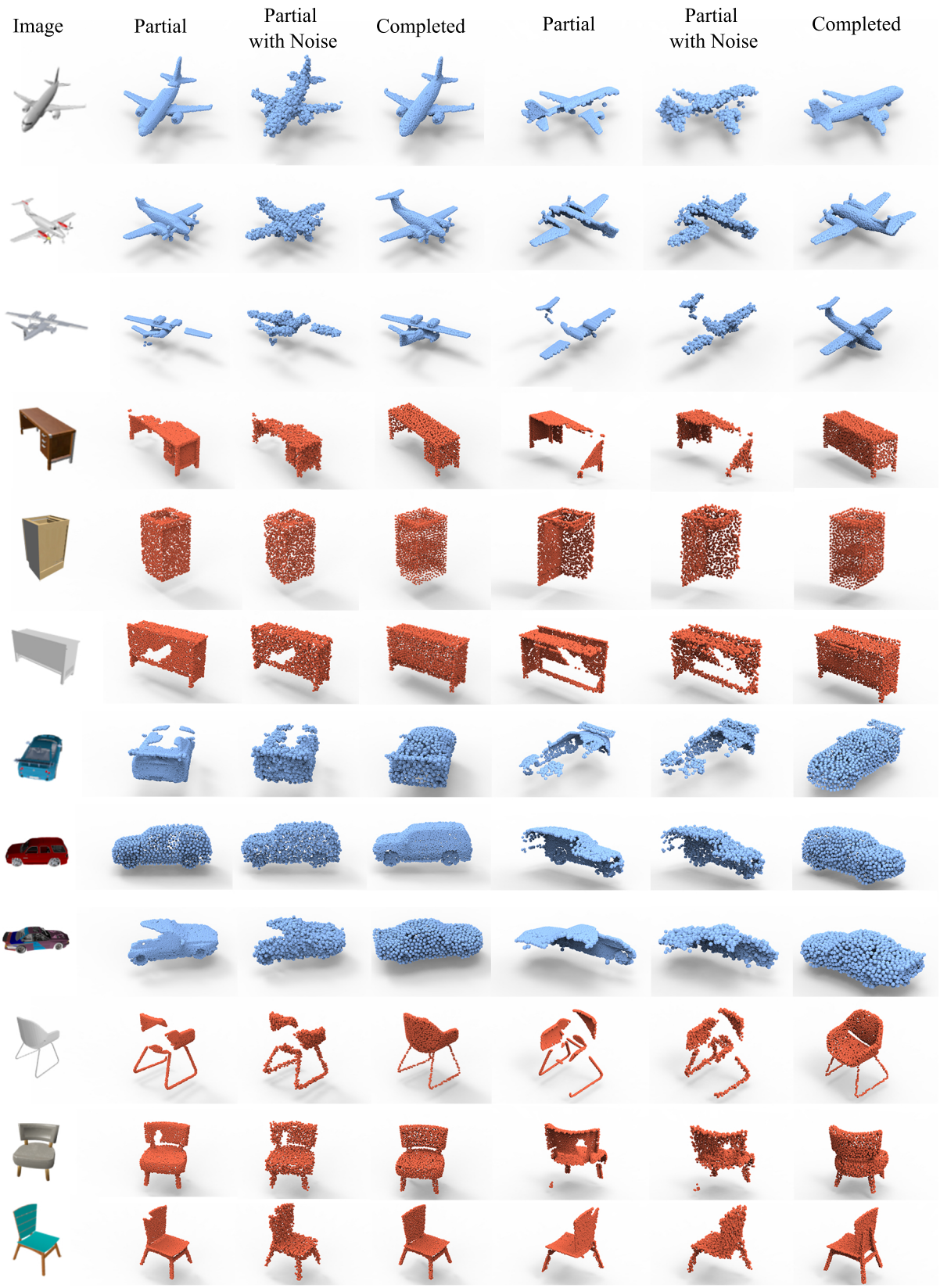

Figure 1. Examples of the categories airplane, cabinet, car and chair from ShapeNet-ViPC. Point clouds from the image viewpoint are shown in columns 2 to 4, from another different viewpoint are shown in columns 5 to 7.

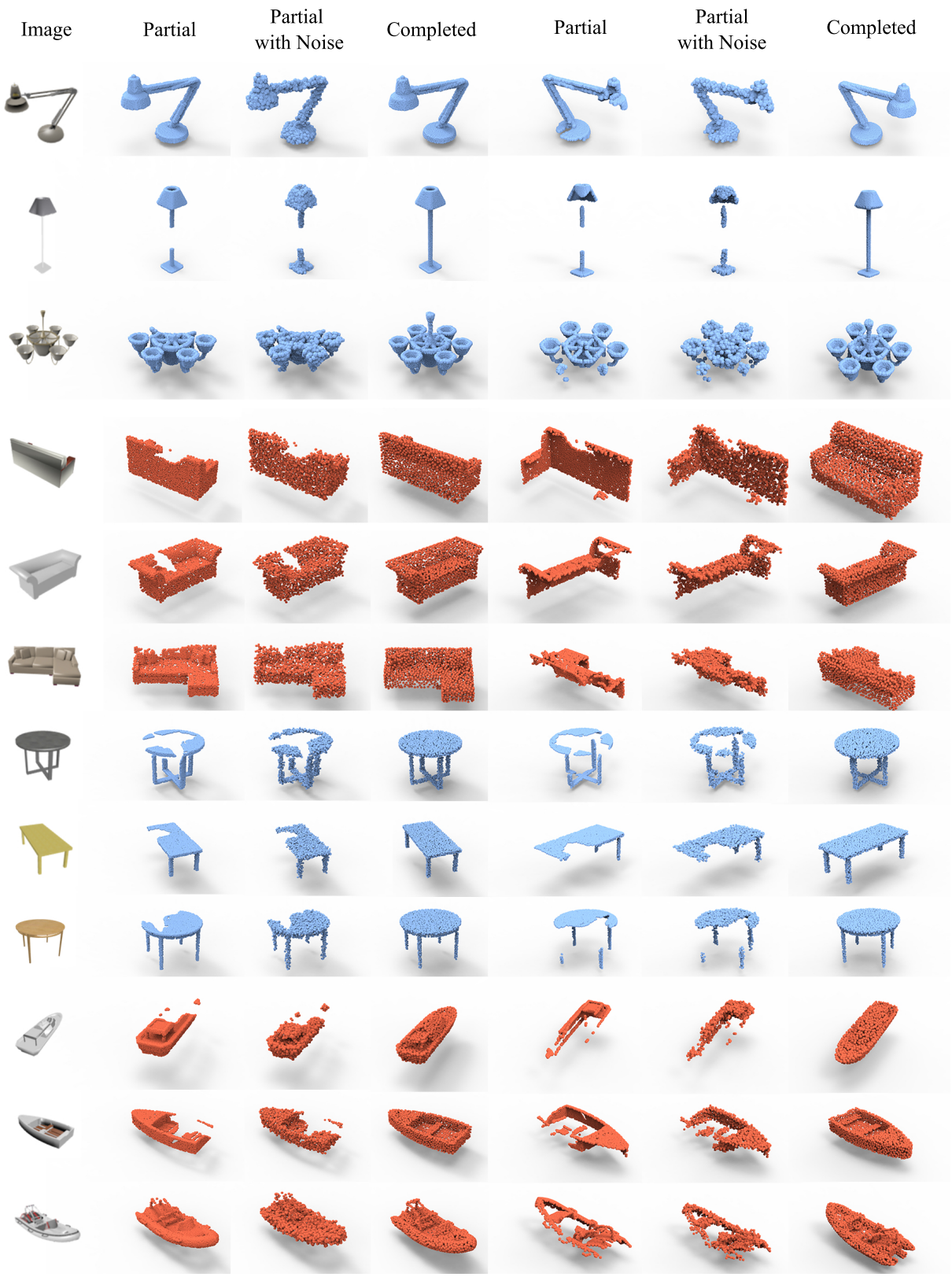

Figure 2. Examples of the categories lamp, sofa, table and watercraf from ShapeNet-ViPC. Point clouds from the image viewpoint are shown in columns 2 to 4, from another different viewpoint are shown in columns 5 to 7.

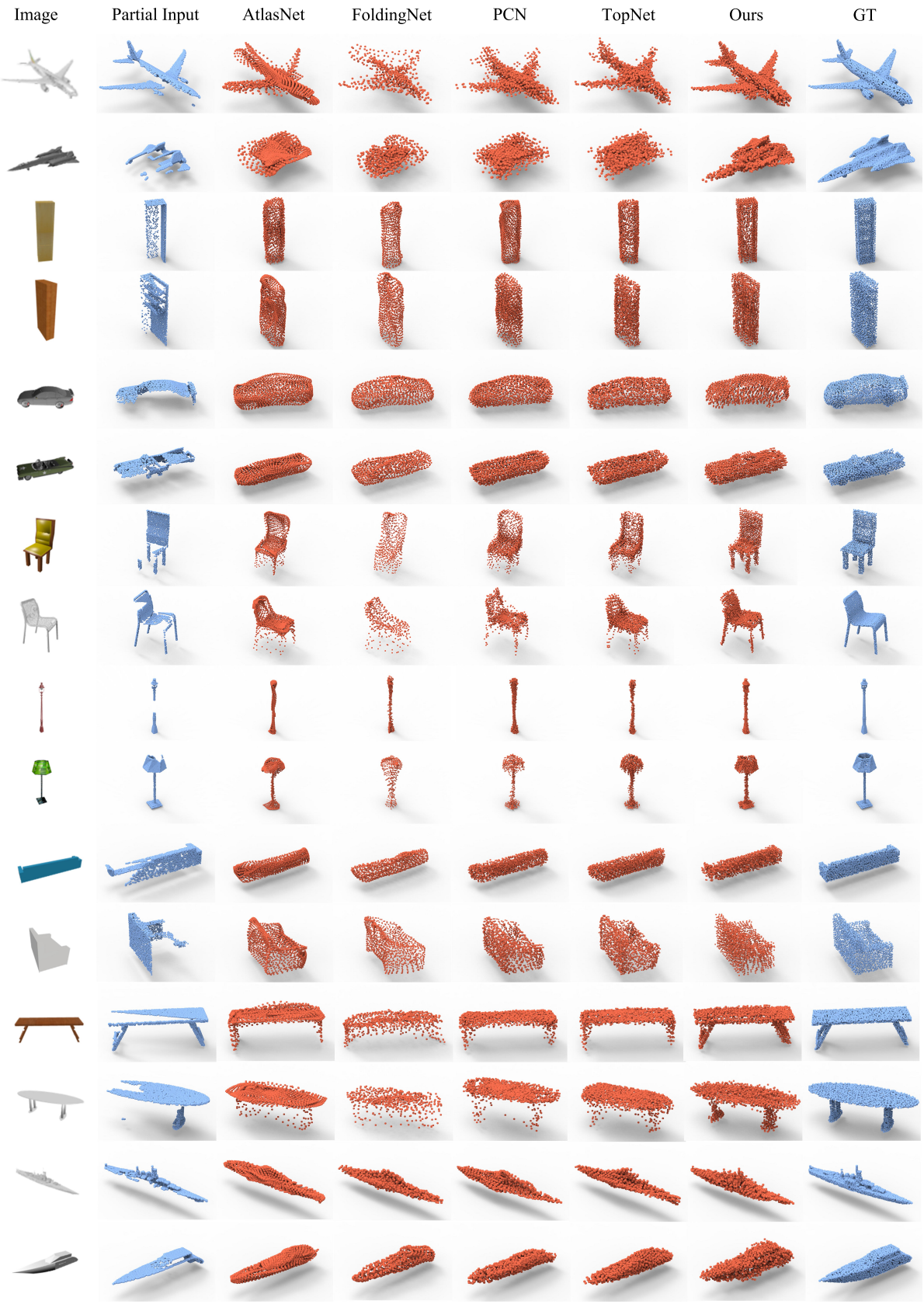

Figure 3. Qualitative comparison on ShapeNet-ViPC. Our method outperforms other baselines on all the eight categories. The resolution for the partial, completed and ground truth point clouds are 2,048.

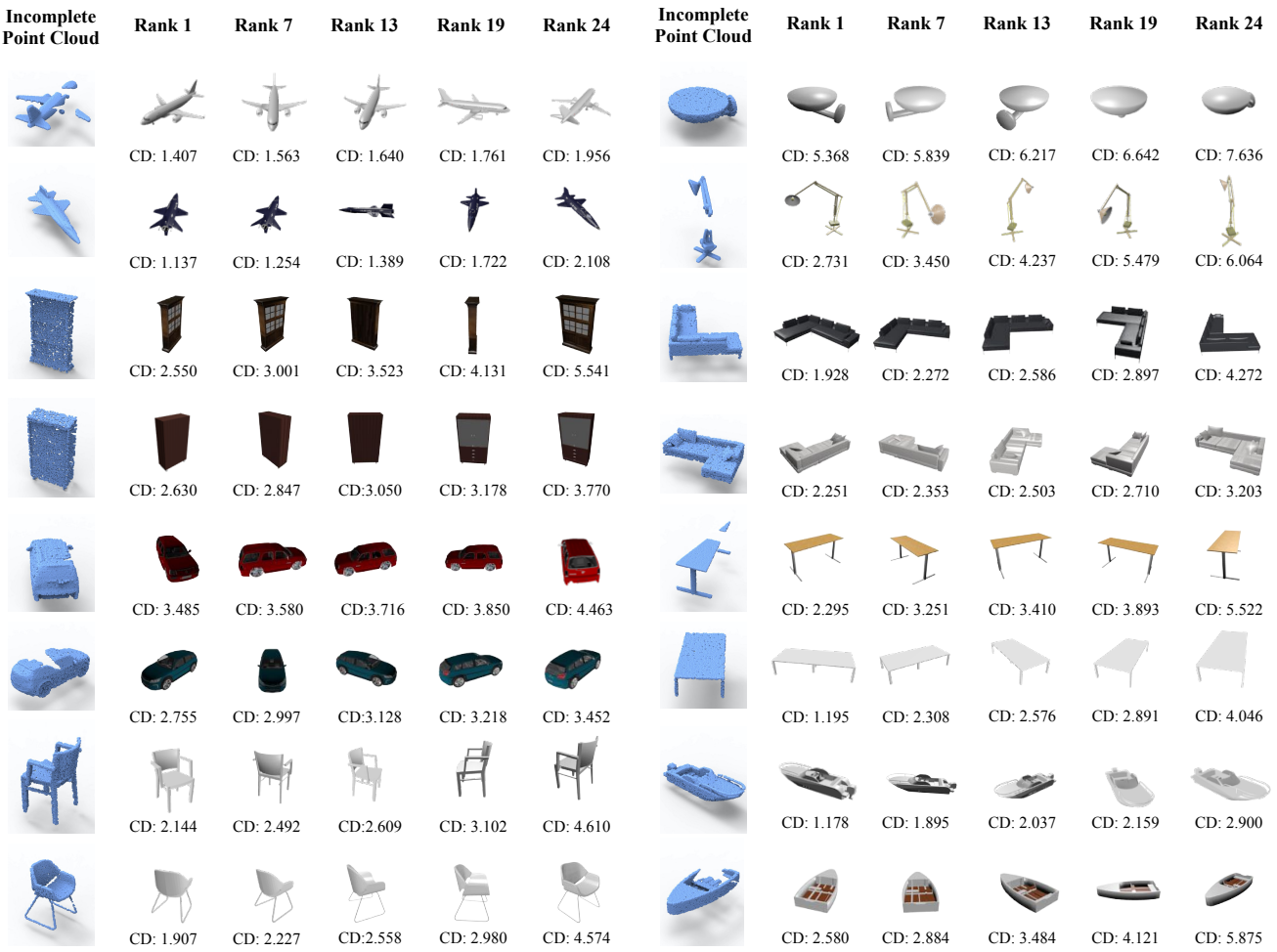

Figure 4. More results to analyze the contribution of the single view image. Views that provide more complementary information can produce better completion results.